DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION

THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS

with MONARCH

Precision-Engineered Aluminum Die Castings

This Monarch-engineered aluminum die cast enclosure does double duty for Westinghouse. It assures immediate sales appeal with its smooth, attractive appearance. It offers maximum strength and durability. It provides for easy installation through the specially designed knockout plugs for leading in the cable.

Every day more and more product designers and purchasing executives turn to Monarch for die castings designed and engineered to solve specific production problems. Monarch always meets their requirements. That's why today so many of America's "blue-chip" manufacturers bring their castings problems to Monarch . . . not just for aluminum die castings, but for aluminum permanent mold and VELVAGLAZE processed castings, Monarcast to fit the job at hand.

If yours is a castings problem it can pay you to call on Monarch for complete castings service.

MONARCH ALUMINUM MFG. COMPANY • Detroit Avenue at West 93rd Street, Cleveland 2, Ohio

DIE CASTING throws new light on old problems

How to minimize product cost? How to produce faster? These problems have faced designers and manufacturers since the "machine age" began. Today, with competition keener than ever, their solution is of utmost importance.

That's why die casting merits your close consideration before you schedule any production procedure . . . for die casting shows the way to ***simplified manufacture, savings in material, fast output.***

Look at these fluorescent lamps. Every part — other than tube stock and electrical equipment — is die cast. Knuckles for the "feather touch" swinging arms, housings for transformers, mountings for clamping to desks or drafting tables, and streamlined base for setting on flat surfaces, are all produced quickly and economically here at Mount Vernon . . . and so "clean" that further machining is unnecessary.

Die casting is not a better way of producing these items, it is the ***best.*** It is modern industry's high-speed, money-saving production tool.

Whatever **your** product, simple or intricate, it will pay you to make maximum use of the die casting process. Let us have your specifications. We'll gladly make recommendations based upon your specific needs. And in the light of our extensive experience, we feel confident we can show you the way to increased production, lower unit costs—and better products too.

MT. VERNON
DIE CASTING CORP.
MT VERNON NEW YORK

JANUARY 1951
Vol. 9 No. 1

DIE CASTINGS

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COVER—TEXTILE MACHINERY builders are using more and more die cast parts where accuracy, intricacy, cost and dependability are important. In this view of a textile mill, each machine is equipped with a die cast aluminum yarn tensioning device manufactured by Walter Kidde & Co., Inc. Details of this interesting mechanism will be presented in the February issue of DIE CASTINGS.

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customers who discriminate

have always selected

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logical and reliable source

to supply quality

zinc alloy die castings

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OF THE DIFFERENCE

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1810 CLINTON STREET • TOLEDO 7, OHIO

about buying
DIE CASTINGS

SERVICE—Your die casting supplier must have the facilities for prompt shipment of finished castings, combined with a service organization to give you immediate consultation on design or production problems.

QUALITY—Your die casting supplier must have complete quality control from raw ingot to finished product to assure "on grade" castings at all times.

FLEXIBILITY—Your die casting supplier must have the ability to produce every type and size of casting in either zinc or aluminum alloys.

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LETTERS *to the Editor*

REQUESTS FOR ARTICLES

Please send me 5 sets of tear sheets on the article "Hard-Surfacing for Aluminum Suggests New Uses for Die Castings." This article is found in your Nov., 1950, issue of Die Castings.—A. H. D.

We no longer have our copies of the issues for October and November, 1949, which contain the article "Metallurgical Aspects of Heat Checking in Brass Die Casting Dies." Would you kindly send us a tear sheet for this article?—A. M. S.

The article "Dental Company Finds Plating Is Practical on Aluminum Die Castings," which appeared in the October, 1950, issue of Die Castings on pages 58-59 is very interesting to us. If possible, we would appreciate receiving tear sheets of this article.—B. A. S.

We would appreciate a copy of the tabulation mentioned on Page 71 of your November issue, "on the size, speeds and ranges resulting from recent plant experiences of the die casting machine manufacturers."—F. W.

All the above articles have been forwarded.—Ed.

BOOK TRANSLATION

I was interested in the first letter appearing in the December issue of DIE CASTINGS. There is a man in the die casting business, Mr. Fred J. Tobias, who is associated with Hampden Brass and Aluminum Company, Springfield 1, Massachusetts, who at one time translated Frommer's "Spritzgusstechnik." Perhaps you may wish to refer the reader "B.L." to Mr. Tobias to ascertain whether the sections which Mr. Tobias translated are of interest to him.—C.R.M.

(Continued on Page 8)

What can PARKER do for Me?

Send for this **FREE** *Booklet which tells of* **PARKER'S 16 Point** *Production Control . . . and what it can do for you.*

PARKER'S 16 Point Production Control program is your assurance of perfect die castings, exactly to your specifications. Find out how the **PARKER** program works. Use **PARKER'S** facilities on your next die casting problem. Send for the **FREE** booklet today!

PARKER WHITE-METAL CO. - 2144 McKinley Ave. - Erie, Pa.

PARKER **ALUMINUM** *and* **ZINC** *Die Castings*

DEPENDABLE
BETTER METHODS
SUPER CAST
DIE CASTINGS
BETTER DIE CASTINGS
SINCE 1919

The meaning of a signature!

Through a quarter of a century of knowing how, the SUPER CAST reputation for Better Methods—Better Die Castings, has been recognized.

Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

SUPER CAST has kept faith, always deserving the mark it bears. SUPER CAST means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsement.

THE SUPERIOR DIE CASTING COMPANY

1001 London Road CLEVELAND 10, OHIO

Detroit Chicago Pittsburgh
Philadelphia New York

LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

A-1. SAMPLES OF TINY DIE CASTINGS and bulletins covering production facilities are offered by Gries Reproducer Corp. The company specializes in extremely small zinc die castings.

A-2. LITERATURE AND DESIGN INFORMATION on aluminum and magnesium die castings are available from Litemetal Dicast, Inc.

A-3. MELTING KETTLES and allied foundry equipment for use in die casting are described and illustrated in C. H. Milles Foundry Co.'s Catalog No. 101.

A-4. THE 16-POINT PRODUCTION CONTROL PROGRAM used by the Parker White-Metal Co. to maintain die casting quality in its plant is explained in a company bulletin.

A-5. SAMPLES AND LITERATURE on the Tap-Lok insert will be sent by the Groov-Pin Corp. The Tap-Lok is made of hardened steel, and is inserted with a special tool.

A-6. REVERBERATORY FURNACES for melting aluminum are described in literature from the Stroman Furnace & Engineering Co. The line ranges from 300 to 10,000 pound capacities in dip-out and tilt models.

A-7. THE CERTIFIED ZINC ALLOY PLAN is the subject of a bulletin available from the American Die Casting Institute. The plan assures users of member companies' die castings of "on grade" zinc alloys.

A-8. HAND AND MOTOR DRIVEN models of a machine used to fill recessed letters and designs on die cast parts with enamel are explained in literature offered by the Acromark Co.

A-9. "ADVANCED BARREL FINISHING," Booklet D-1, is available from the Almco Div., Queen Stove Works, Inc. The booklet describes Almco equipment used for deburring, grinding and finishing.

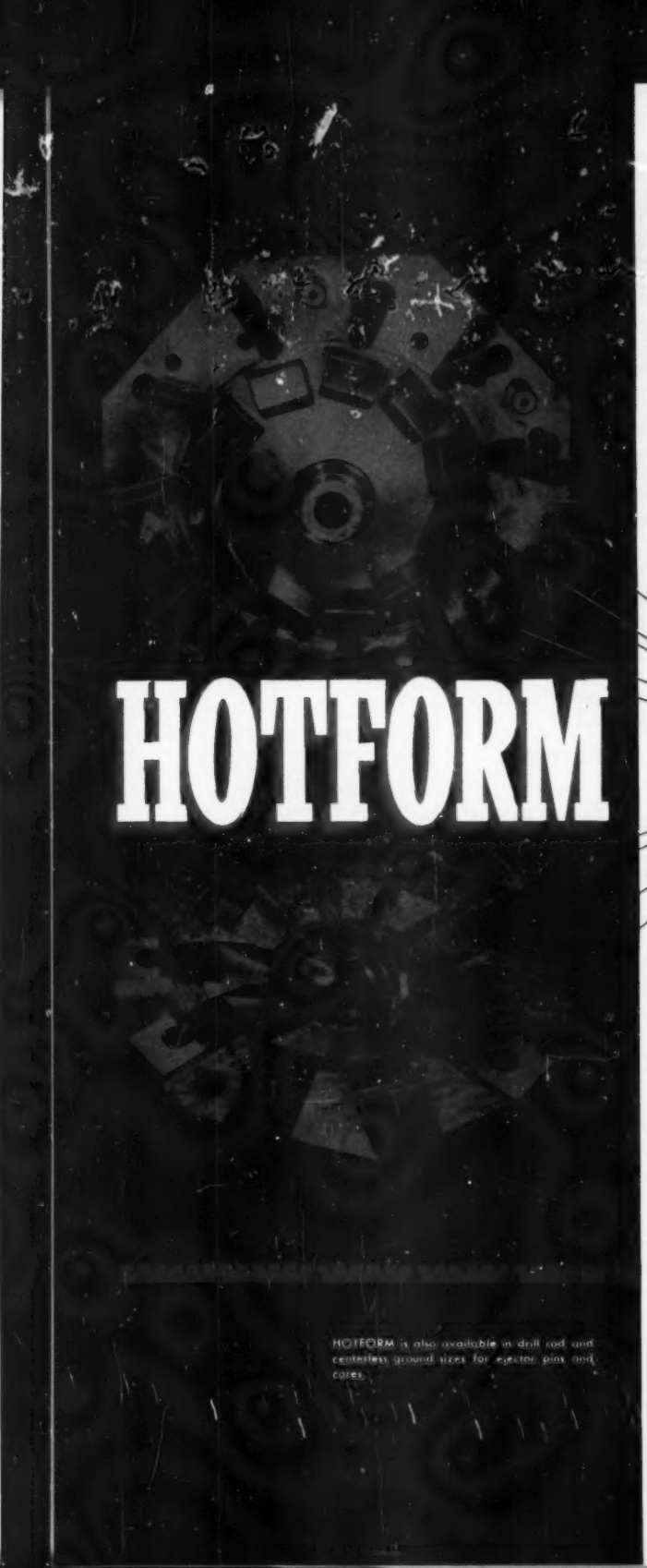
A-10. POWER SCREWDRIVERS and nut drivers, special assembling machines and a motorized selective feeding device manufactured by the Detroit Power Screwdriver Co. are described in a company catalog.

A-11. STEP BY STEP INSTRUCTIONS for the use of Enthone metal and enamel strippers, blackening processes and emulsion cleaner are offered by Enthone, Inc.

A-12. BLACK MAGIC, a Mitchell-Bradford Chemical Co. processs for applying black oxide coatings with hand or automatic equipment is described in company literature. The coating meets military specifications for black oxide finishes.

A-13. PARTS TOO LARGE TO BE SOAKED in tanks or cleaned in washing machines can be handled with a steam gun. Oakite Products, Inc. folder F7338 tells how this equipment operates.

(Continued on Page 8)



HOTFORM

HOTFORM is also available in drill rod and centerless ground sizes for ejector pins and cores.

picked

for performance

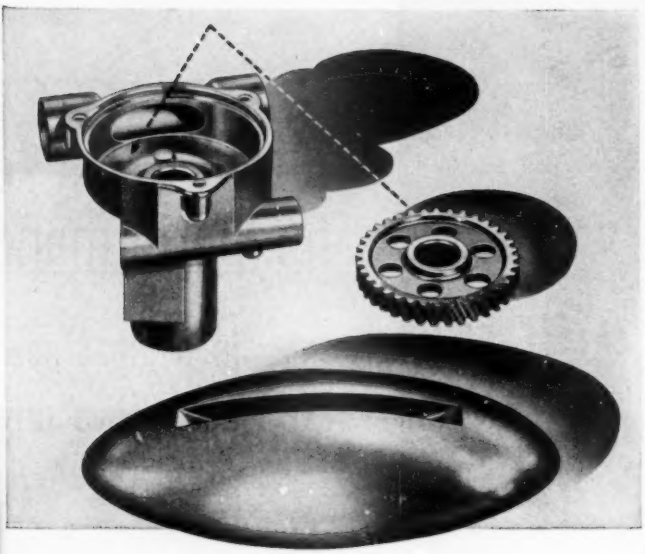
in a great new automotive drive!

These beautiful impeller die casting dies for an outstanding automatic transmission are made of HOTFORM—because HOTFORM assures maximum die life and can be relied upon not to crack or show movement in heat treating, even in large and complex shapes. In this exacting application, die movement is stated to have been held within .002". ● Your next tough application merits HOTFORM. Let us discuss it with you!

FIRST QUALITY TOOL STEELS

Vanadium-Alloys
STEEL COMPANY
LATROBE, PENNA.

Colonial Steel Division — Anchor Drawn Steel Co.



3 DIE CASTINGS
for the Same Customer

3 SETS of PROBLEMS
for the Die Caster

Each die-cast part, whether for the same customer or not, presents its own set of problems to die casting technicians who understand all phases of the die casting process from die design to machine operation. Typical are the three parts, pictured here, all for the same customer.

1. **DIE CAST GEAR HOUSING** for a power unit — requires perfect alignment of shaft holes to assure smooth, efficient operation of the appliance in which it is used.
2. **DIE CAST HELICAL GEAR** — with left-hand helix angle, 18-24 diametral pitch, stub tooth 20° 23′ — presents the difficult problem of cutting threads to exact specifications in a steel die . . . to produce perfect cast threads.
3. **DIE CAST BASE** for home appliance—the primary problem here is to produce a smooth surface finish which can be satisfactorily coated with paint, enamel or other finishes.

Of course, there was a variety of other problems in connection with each casting — but the point is that the customer has learned to rely on MILWAUKEE for their solution. It may be to your advantage to do likewise.

MILWAUKEE DIE CASTING COMPANY
1019 N. FOURTH STREET • MILWAUKEE 3, WISCONSIN

A 5893-2/3

LITERATURE AND SERVICES

(Continued from Page 6)

A-14. SELF-TAPPING SCREW APPLICATIONS are shown in Form 449 from Parker-Kalon Corp. The folder tells where to use these screws and gives the proper screw for each application.

A-15. AN AIR MOTOR with electrically controlled 4-way valve is presented in literature from the Bellows Co.

A-16. CASE HISTORIES and other information on backstand belt grinding and finishing with 3M equipment is offered in a booklet published by the Minnesota Mining & Mfg. Co. The booklet also tells about the 3M survey service for converting present equipment.

A-17. A CHROMIUM-LIKE APPEARANCE and a corrosion-resistant surface as a base for organic coatings can be produced by the Unichrome dip process described in a leaflet issued by United Chromium, Inc.

A-18. A HIGH SPEED TAPPING HEAD in which tap driving pressure is automatically regulated is described in literature offered by the Procunier Safety Chuck Co. Operators can detect dull taps by an increase in driving pressure needed.

A-19. GRINDER-MILLERS manufactured by Precise Products Co. can be attached to lathes and other machine tools. They are used for grinding, milling, micro-finishing and polishing.

A-20. BURNISHING MIXTURES and suggestions on how to use them are contained in a catalog issued by the Abbott Ball Co. The company manufactures burnishing shapes made of bearing ball steel in many shapes and sizes.

LETTERS TO THE EDITOR

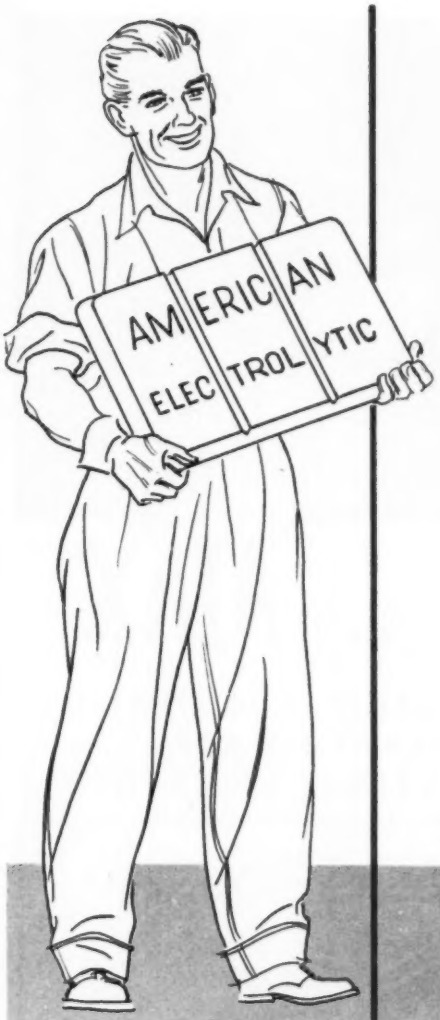
(Continued from Page 4)

REQUESTS MHC ARTICLE

In your November issue you had a very interesting article on hard surfacing aluminum.

I showed this article to our chief metallurgist and he wanted to keep the book. Will you please mail me tear sheets of this so I can keep my file of *Die Castings* complete.—W. J. G.

Tear sheets forwarded.—Ed.



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SLAB ZINC

FOR QUALITY PRODUCTION

A RELIABLE SOURCE

FOR DIE CASTING

REQUIREMENTS

AMERICAN ZINC SALES CO., Distributors
for AMERICAN ZINC, LEAD & SMELTING CO.
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Induction melting furnace. A

Electrically heated launder. B

Induction holding and pumping unit. C

Pump nozzle. D

Cold chamber of die casting machine. E

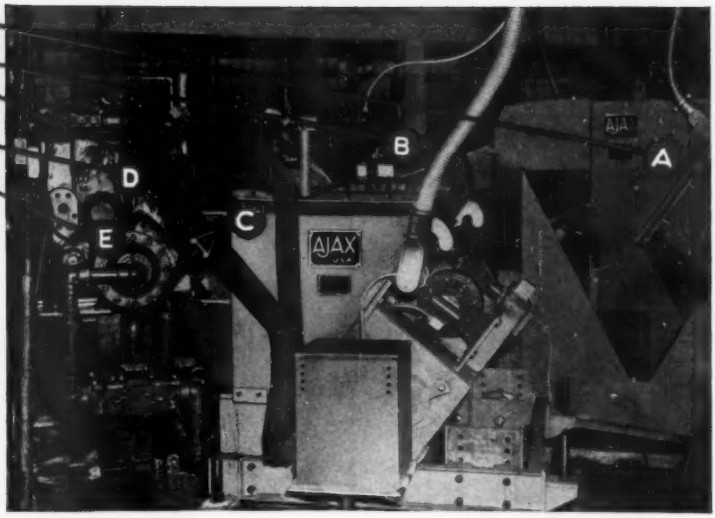


Photo courtesy of Scintilla Magneto Div., Bendix Aviation Corp.

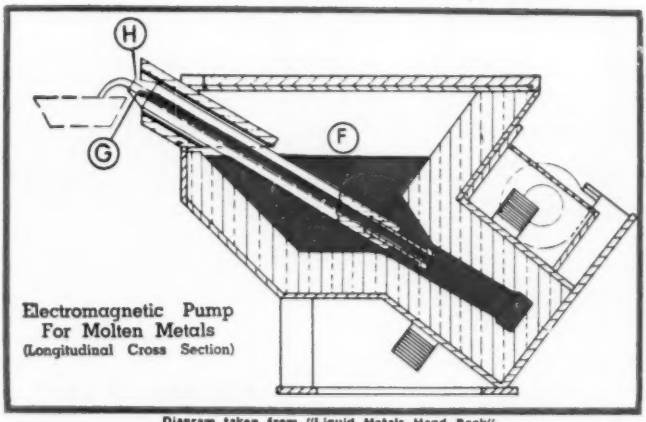
Streamlined Molten Metal Supply by **AJAX**

NO HAND LADLING

CONTINUOUS AUTOMATIC OPERATION OF DIE CASTING MACHINES

Once the metal is in this AJAX furnace, no further attention is necessary . . . no checking for temperature or timing. An electromagnetic pump (connected with an automatic timer and with the controls of the casting machine) discharges a predetermined weight of metal at precise and regular intervals. This method averages 25% greater output of acceptable castings over that of hand ladling.

In the induction pump (diagram at right) the metal level in the nozzle (G), while idling, is held at all times near the opening (H) and high above the level (F) in the furnace. Thus oxidation in the tube is prevented. When pumping, the molten metal travels only a very short distance, and each shot is completed swiftly.



Electromagnetic Pump For Molten Metals (Longitudinal Cross Section)

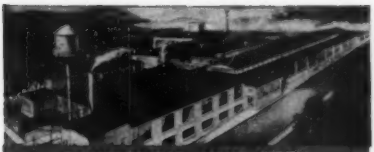
Diagram taken from "Liquid Metals Hand Book" Published by Atomic Energy Commission.

AJAX TAMA-WYATT

AJAX ENGINEERING CORPORATION, TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting



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KALAMAZOO, MICH.

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Precision engineers are trained to consider die castings in relation to the requirements of the particular need. That's why product by product . . . industry by industry . . . die casting is replacing costlier, less dependable and less accurate methods of fabrication. Complete laboratory with spectrograph, X-ray and physical testing equipment maintained to insure precision control of all products.

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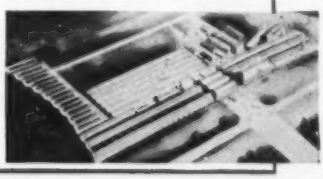
- **MAGNESIUM**
- **and ZINC**

Call a PRECISION Engineer, Today!

He Can Help You!

Complete finishing and plating facilities are available at our Kalamazoo plant.

OVER-SEAS AFFILIATION. PRECISION offers the only overseas affiliation with the Wolverhampton Die Casting Co., Wolverhampton, England, largest commercial die casting company in the British Isles or on the Continent. Our arrangement permits exchange of certain outstanding developments in size and finishing processes on both sides of the Atlantic.

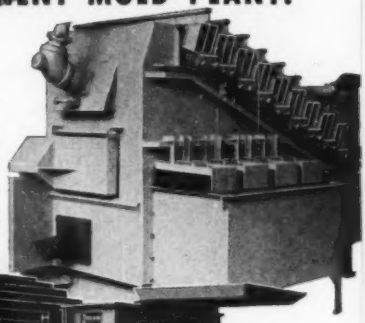


PRECISION CASTINGS CO., Inc.
212 Walnut St., Fayetteville, N. Y.
Syracuse, N. Y. · Cleveland, O. · Kalamazoo, Mich. · Chicago, Ill.
British Affiliation — Wolverhampton Die Casting Co., Wolverhampton, England

STROMAN FURNACES

FOR *Every* ALUMINUM MELTING JOB IN *Any* FOUNDRY, DIE CASTING OR PERMANENT MOLD PLANT!

Stroman builds the most efficient, fastest melting and most economical furnaces available. One of these famous four will handle your every melting requirement at great savings.

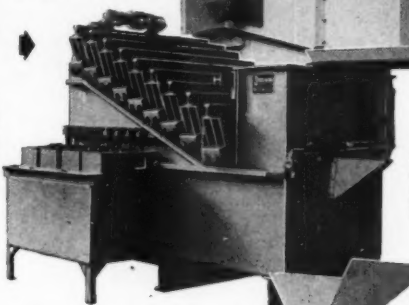


FRONT VIEW showing dip-out box, tapping spout, slagging and cleanout door.

STROMAN TYPE "MC" ALUMINUM DIP-OUT REVERBERATORY FURNACE

Bath capacity from 500 to 10,000 lbs. Aluminum

A combination of breakdown and holding furnaces makes this the most economical furnace ever designed for aluminum melting. It can be used for melting, holding, alloying, fluxing, for either casting or producing ingots. Cold metal does not reach the molten bath. Hot metal is always available for dipping. No iron pots or crucibles to buy. Oil, gas or combination oil-gas fire. Complete automatic controls are available if desired.

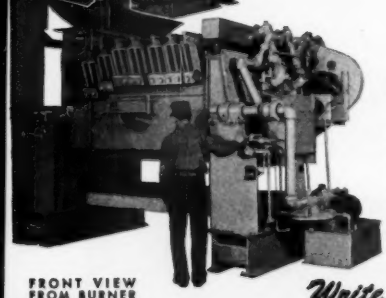


REAR VIEW showing charging hopper and special pneumatic charger.

STROMAN ECONOMELT REVERBERATORY FURNACES

Featuring the famous Stationary Lip Pour which assures a constant pouring arc and eliminates the necessity of moving the ladle at any time during the pour. The Economelt is without a doubt one of the finest reverberatory furnaces ever built. Melting speeds for Aluminum, Brass, Bronze, or Grey Iron are unsurpassed. All metal is preheated and melted in suspension in the throat of the hopper. This furnace is showing upwards of 40% savings in fuel costs. Oil, Gas or Combination Oil-Gas Fire. Charging Hoist and Furnace tilting are operated hydraulically. Hydraulic systems are furnished as complete units including operating valves, etc. Capacity in Aluminum up to 10,000 lbs. total bath. Write for Bulletin No. 635 for complete information.

FRONT VIEW from charging end showing a Stroman Skip Hoist.

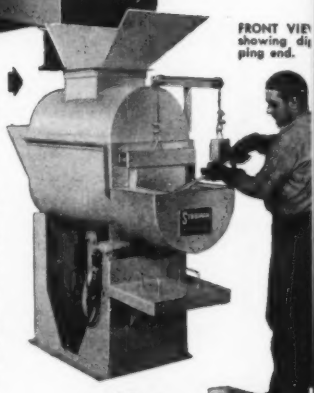


FRONT VIEW FROM BURNER END.

STROMAN TYPE "DS" REVERBERATORY FURNACE FOR MELTING ALUMINUM

300 and 500 lbs. bath capacities.

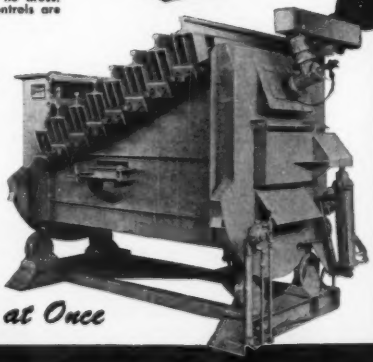
The "DS" Furnace provides a complete melting unit for each Die Casting Machine or Small Permanent Molds. It is a small compact unit that may be easily moved to any desired position in the plant. Eliminates the necessity of having both breakdown and holding furnaces. Saves over 50% in fuel costs over any other type. Ingots and returns are melted where they are cast. There is no handling of hot metal except to the die or mold. Metal is melted in a reducing atmosphere and is free from porosity with little or no dross. Complete automatic controls are available if desired.



FRONT VIEW showing dipping end.

STROMAN TYPE "SW" ECONOMELT REVERBERATORY FURNACE

Same as Economelt described above except that it is tilted by an air ram, and does not incorporate Stationary Lip Pour. It is excellent as a breakdown furnace for ingot and returns, in die or sand casting and permanent mold plants. Suitable for re-alloying returns or running back machine shop scrap. A large opening is provided below burner equipment to facilitate such operations as drossing, fluxing, alloying, or puddling back light scrap or returns.



Write for Complete Information at Once

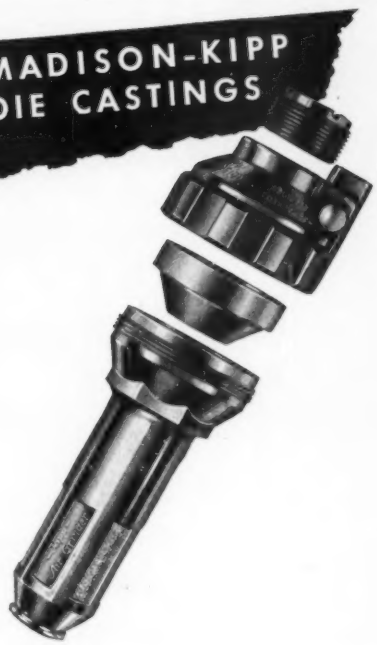
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

Double Duty Page of Timely Importance

MADISON-KIPP DIE CASTINGS



KIPP *Air* GRINDERS

The die cast components for grinders here illustrated have a requirement basic to hundreds of other components for mass production in civilian or military usage — uniform accuracy, close concentricity and parallelism, thread strength and alignment, lightness and smooth finish.

No other process is so flexible; so adequate in solving so many production problems as the Madison Kipp Hi-High pressure die casting process.

With its 50,000 rpm speed this refined Kipp Air Grinder is a most valuable tool both in tool making and production work. It is especially useful for high speed polishing of airplane and similar parts.

For over 20 years, mechanics everywhere have been pleased with the variety of work that can be done so well with the Kipp Grinder. Please include your DO rating when ordering, if it can be applied. The current price in the U.S.A. for Model JA is $42.00. It takes wheels up to ⅞". Other Kipp models for larger wheels.

MADISON-KIPP CORPORATION

213 WAUBESA STREET, MADISON 10, WIS., U.S.A.

ANCIENS ATELIERS GASQUY, 31 Rue du Marais, Brussels, Belgium, sole agents for Belgium, Holland, France, and Switzerland.

WM. COULTHARD & CO. Ltd., Carlisle, England, sole agents for England, most European countries, India, Australia, and New Zealand.

- *Skilled in* DIE CASTING *Mechanics*
- *Experienced in* LUBRICATION *Engineering*
- *Originators of Really High Speed* AIR TOOLS

to be sure

McCULLOCH MOTORS uses
FEDERATED ALUMINUM DIE CASTING METAL

Major parts of this new portable chain saw, manufactured by McCulloch Motors Corporation, Los Angeles, are die cast of Federated aluminum alloy F-4110.

Both piston and cylinder are cast of the Federated metal because their intricacy demands the high fluidity and machinability of F-4110.

Note the extraordinary fins on the cylinder . . . thirty of them . . . with a thickness of 1/32" at the outer edge and up to 3¼" deep!

Such castings demand consistently uniform metallurgical qualities . . . demand Federated Aluminum Die Casting Metals. *To be sure* of best results start with the best metal . . . Federated metal.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY • 120 BROADWAY, NEW YORK 5, N. Y.

Is YOUR Supplier of Zinc Die Castings On This List?

Only these Companies Are Licensed to Use the Quality Certification Seal....

A & A Die Cast and Plastic Molds Co., West Los Angeles, Calif.
The Accurate Die Casting Co., Cleveland, Ohio
Advance Pressure Castings, Inc., Brooklyn, N. Y.
Advance Tool & Die Casting Co., Milwaukee, Wis.

Badger Die Casting Co., Milwaukee, Wis.

Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Cleveland Hardware & Forging Co., Cleveland, Ohio
Congress Drives Division, Tann Corp., Detroit, Mich.
Continental Die Casting Corp., Detroit, Mich.
Division of F. L. Jacobs Co.
Crown City Die Casting Co., Pasadena, Calif.

Doehler-Jarvis Corp., Pottstown, Penna.
Doehler-Jarvis Corp., Toledo, Ohio
Doehler-Jarvis Corp., Chicago, Ill.
Dollin Corporation, Irvington, N. J.
Du-Wel Metal Products, Inc., Bangor, Mich.

Fanarc Manufacturing Co., Inc., Whittier, Calif.
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Glenvale Products Corporation, Detroit, Mich.
Globe Imperial Corporation, Rockford, Ill.
C. M. Gray Mfg. Co., East Orange, N. J.

Heick Die Casting Corporation, Chicago, Ill.
Hilfinger Corporation, Toledo, Ohio
The Hoover Company, North Canton, Ohio

Kamin Die Casting & Mfg. Co., Chicago, Ill.
Kiowa Corporation, Marshalltown, Iowa
Paul Krone Die Casting Co., Chicago, Ill.

Madison-Kipp Corporation, Madison, Wis.
Milwaukee Die Casting Co., Milwaukee, Wis.
Modern Die Casting Corp., Chicago, Ill.
Monarch Aluminum Mfg. Co., Cleveland, Ohio
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.

New Products Corp., Benton Harbor, Mich.

Paragon Die Casting Co., Chicago, Ill.
Parker White Metal Co., Erie, Penna.
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Precision Castings Co., Inc., Cleveland, Ohio
Precision Castings Co., Inc., Reed Metal Crafts Division, Chicago, Ill.
Pressure Castings, Inc., Cleveland, Ohio

Racine Die Casting Co., Racine, Wis.

St. Louis Die Casting Corp., St. Louis, Mo.
Schultz Die Casting Co., Toledo, Ohio
Sterling Die Casting Co., Inc., Brooklyn, N. Y.
Stewart Die Casting Div. of Stewart Warner Corp., Bridgeport, Conn.
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Stroh Die Moulded Casting Co., Milwaukee, Wis.
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The Tool-Die Engineering Co., Cleveland, Ohio
Twin City Die Casting Co., Minneapolis, Minn.

Union Die Casting Co., Ltd., Los Angeles, Calif.
Universal Die Casting Co., Los Angeles, Calif.

Wells Die Casting Co., San Francisco, Calif.
Western Die Casting Co., Emeryville, Calif.

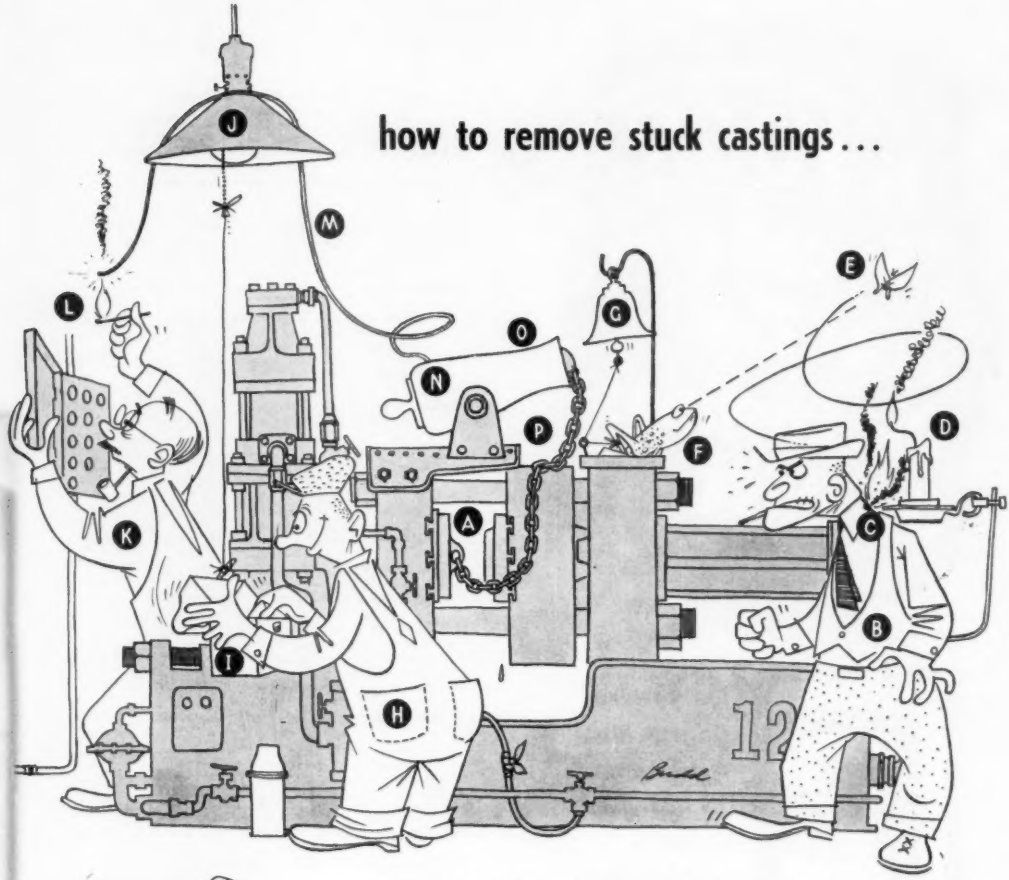
The die casters whose names appear here are licensees of The Certified Zinc Alloy Plan. As such their sampled die castings prove on analysis to be of '*on grade*' alloy meeting ASTM specifications.

When you buy from any of these die casters you are *sure* of obtaining zinc die castings manufactured in a plant maintaining proper alloy control.

(A bulletin describing the Certified Zinc Alloy Plan and explaining what it means to the buyer is available on request. Send for a copy.)

AMERICAN DIE CASTING INSTITUTE, INC.
366 MADISON AVENUE NEW YORK 17, N. Y.

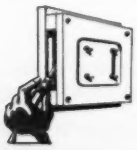
how to remove stuck castings...



When stuck casting (A) is spotted by foreman (B) he gets hot under the celluloid collar (C) igniting candle (D) which attracts moth (E) who catches eye of hungry bullfrog (F) which leaps, ringing bell (G). Operator (H) hearing bell thinks it's lunch time and opens lunch box (I) switching off light (J). Maintenance man (K) thinks fuse has blown, lights match (L) which ignites fuse (M) which fires cannon (N). Cannon ball (O) is attached to casting by chain (P) and when fired naturally withdraws casting from the die.

1. Dip blow pipe in Die Slick

2. Spray sparingly over die cavity face



3. Spray on ejector mechanism

how to prevent stuck castings

Why fight with stuck castings when it's so easy to prevent them by using Die Slick regularly on all your machines. Four out of five die casters use Die Slick because they have proved it helps maintain production, cut down-time and save rejects even on the most difficult jobs.

Unlike "home-made" concoctions, Die Slick consistently eliminates costly sticking, scoring, soldering; is definitely non-staining; often makes tricky jobs simple. Five grades suit all requirements.

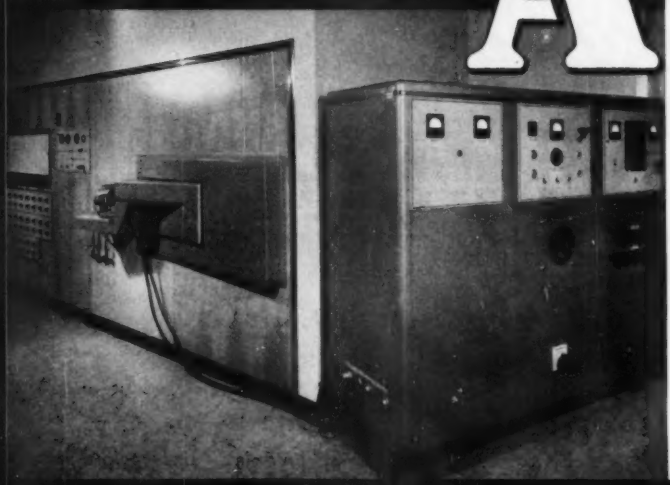
Send for a week's supply to try on your most difficult job (please specify whether for zinc, aluminum, magnesium, or brass). If you're not completely satisfied we'll cancel the invoice.

start every job with

DIE SLICK *the industry's standard die lubricant*

G. W. SMITH & SONS, INC., 5403 Kemp Road, Dayton 3, Ohio

The Quantometer is a modern electronically controlled direct reading spectrograph.



now Apex ZINC ALLOYS

are analytically controlled with

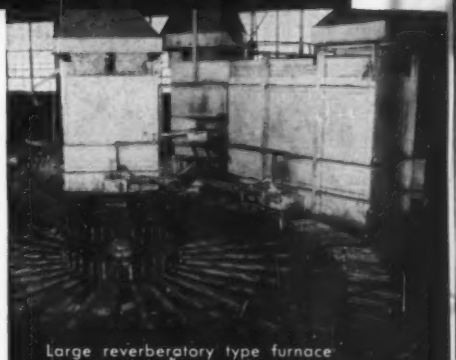
. . . the quantometer

Again Apex sets the pace by establishing precision, analytical control in the production of zinc alloys, as well as aluminum and magnesium alloys . . . through the use of the newest quantometer equipment. Absolute, consistent uniformity is assured—from special high grade raw material to the finished ingot.

And Apex continues the pace by using the reverberatory type 60,000 lb. automatic pyrometer controlled furnace—further assuring alloy uniformity, with a final easy to handle palletized packing for fork truck handling.

Over a quarter century ago Apex set the pace . . . by producing high quality alloys (from strictly virgin metals of the highest purity) . . . by lowering the magnesium content to achieve less hotshortness . . . by establishing constant research to determine proper metal and die temperatures for ultimate physical properties.

Past performance—plus continued technical superiority—assure you that Apex will *continue* to excel in research leadership.



Large reverberatory type furnace

Palletized ingot

Apex smelting company

2537 WEST TAYLOR STREET • CHICAGO 12, ILLINOIS
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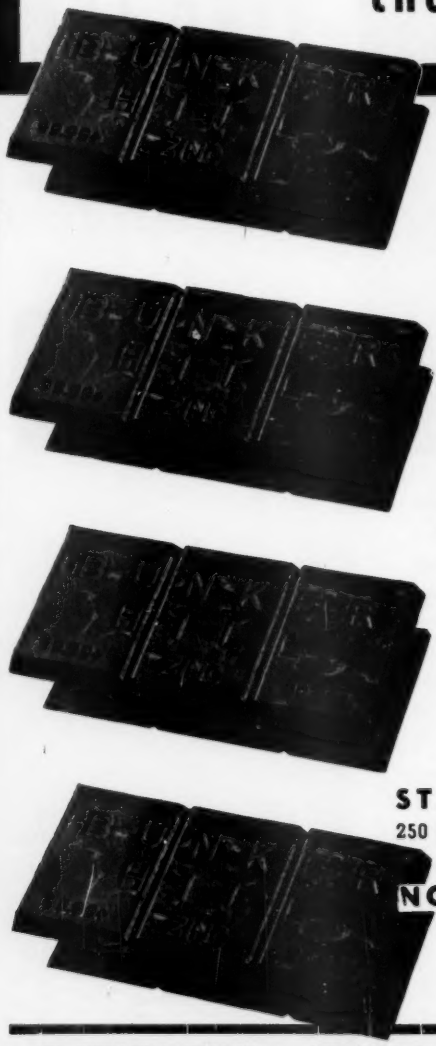
Eliminating the HUMAN ELEMENT



THE die casting industry's specifications for base metals of unvarying high purity, have made mandatory greater precision and efficiency in the production of these metals. In the Bunker Hill electrolytic process, by means of which the first "four-nines" zinc was produced commercially, the human element with its liability to error in the vital concurrent analytical work, is largely eliminated. Bunker Hill extensively employs mechanically controlled devices as a means of making physical and chemical determinations. Microphotometers for spectrographic analysis and electrometric titrating apparatus make possible a refinement of control not humanly attainable. As a result, the purity-constant of Bunker Hill 99.99+% Zinc enables die casters to maintain the high quality necessary for the best physical properties.

DIE CASTING is the Process . . . ZINC, the Metal
BUNKER HILL, the Preferred Zinc

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BUNKER HILL 99.99+% ZINC

PCI

WE DID IT BEFORE...
WE CAN DO IT AGAIN!

PRESSURE is fully prepared to meet the challenge of the Defense Mobilization Program as it should be met ... faithfully and speedily.

EZ

Castings Assembled

Die Castings

Valve costs cut 50% when die cast by Hoover

The Ney Manufacturing Company of Canton, Ohio, makes water bowls for the stalls of dairy cattle. Into each bowl goes a spring-loaded valve, sealed with a fuller ball, that permits water to enter whenever a thirsty Guernsey or Jersey nuzzles the nose lever.

Once these valves were sand cast in one piece from solid brass—an operation that required a baked sand core for each valve and six separate finishing operations.

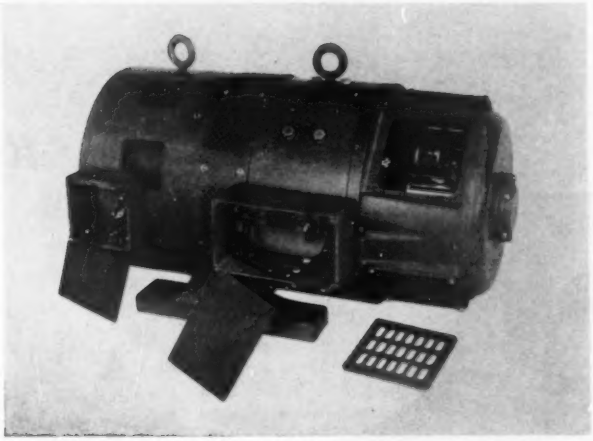
Seeking to reduce costs, Ney Manufacturing Company engineers first designed a two-piece sand casting. Then, after consulting with die-casting experts in The Hoover Company, they modified the design slightly to permit die casting from an aluminum alloy (the finished casting is shown above).

The decision has proved a sound one. In the past several years many thousands of the new die-cast valves have been placed in service, with a 50% reduction in production costs. Returns, due to the need for either cleaning or a new fuller ball, have been less than one-tenth of one per cent.

Happy solutions to production problems like this one are nothing new to The Hoover Company, with its years of experience and its complete engineering, design and production service. Perhaps aluminum or zinc die castings might reduce costs or improve the sales appeal of your product. Ask a Hoover sales engineer to call. Naturally, there's no obligation.

THE HOOVER COMPANY
Die Castings Division, North Canton, Ohio

HOOVER
Specialists in the field of die castings



1. STANDARDIZATION IS MADE POSSIBLE by replacing two different types of brush holders with die cast brass units, thus gaining the economy of this process for the entire line of motors. A single set of tools is used, reducing tooling costs and simplifying inventories.

Die Cast Brass for Simpler Tooling

FOR heavy duty electric motors, die cast brass brush holders have replaced both sand cast brass and die cast zinc at the Electric Specialty Company, Stamford, Conn.

Since brass is specified for brush holders on motors on seagoing vessels where the corrosion problem is most severe, it was decided to use brass brush holders throughout the company's line of large capacity motors, thus simplifying tooling, inventory and specification.

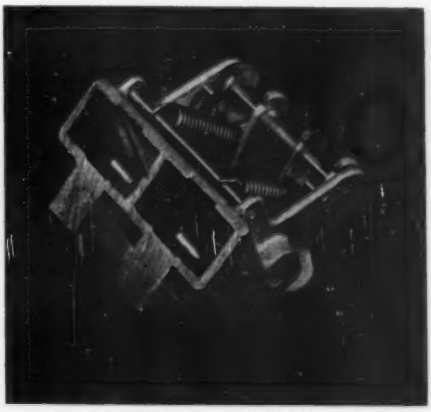
By this changeover, the company is able to standardize on a single type of brush holder which gives improved service for industrial motor applications and meets specifications of Naval and Air Force purchasing.

The economy of die cast brass as compared with the sand castings previously used, has been a deciding factor in the redesign, inasmuch as both types of components have satisfactory physical properties.

The number of units per year is sufficient to provide reasonable amortization of high die costs. Four or eight double brush holders are used with each commutator for large motors such as the one shown in Figure 1.

Material costs, including tool amortization, is ten percent higher for the die castings than for sand castings. However, direct labor costs are 20 percent lower for die castings due prin-

(Continued on Page 54)



2. LIGHT BROACHING cleans out the rectangular cored holes in this die cast brass brush holder. The previous sand cast unit required roughing as well as finishing broach plus a number of other machining operations which have now been eliminated.

HOLES REDUCE

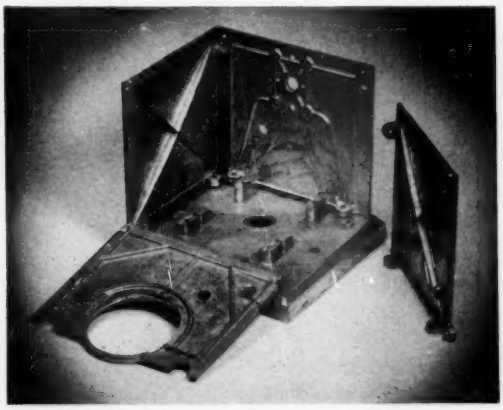
1. ONLY EIGHT SCREWS are required to hold together the six zinc alloy die castings which make up the entire housing of this Follett time stamp. An ingenious use of mating bosses and cored holes, as shown in Figure 2, makes one screw do the work of two in many places, saving on assembly time and labor.

AS LONG AGO as 1906, the Franklin Institute of Philadelphia honored Wilbur J. Follett with an award for his mechanism to stamp the time and date on mail, work records and other documents.

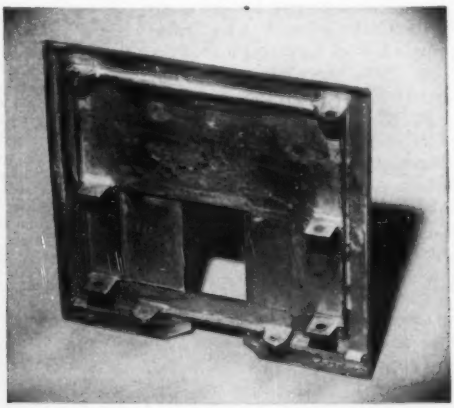
Since that time, many refinements and improvements in product function and manufacturing techniques have been introduced by the Follett Time Recording Company of Newark, N. J., although the basic principle of operation remains unchanged.

One of these improvements—introduced some twenty years ago when such a change represented a radical innovation—was the conversion of most housing components and the

2. SMALL BOSSES mated with cored holes are used here to connect all mating surfaces in such a way that six screws driven into the base and two into the upper portion make a complete housing assembly. Hinged front piece and separate cover are automatically held in place when sides and base are fastened.



3. AFTER MANY YEARS and the production of thousands of units, the original tools for producing the die cast parts are still in good shape to furnish low-cost components. Shown below is the cover casting with integral lugs to locate it and lock it into position.



AND BOSSES ASSEMBLY TIME

various number wheels to zinc alloy die castings.

These die cast parts are still in production, using the original tools, and still provide a most practical and economical method for mounting and enclosing the clock-actuated mechanism.

The wisdom of applying die cast housing parts to this business device has long since been proved; tool costs have been amortized and piece costs are lower than would be feasible by any other fabricating method.

Almost all visible metal parts of the manually operated time stamp, Figure 1, are die cast. Most exterior parts are finished with a baked black wrinkle enamel which has the advantage of being easy to apply and holding tenaciously to the metal surface without preliminary priming or chemical treatment. It also covers small surface defects such as flow marks, cold shuts, etc.

Interior surfaces get a coating of a black flat enamel which gives a neat and uniform appearance.

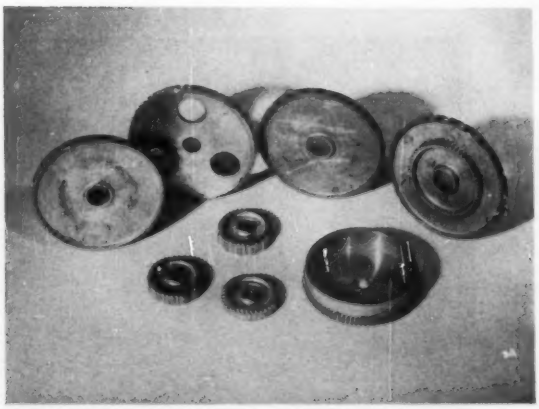
Six zinc die castings, Figure 2, make up the housing itself and are designed in such an ingenious way that the entire structure can be assembled and held rigid by means of eight machine screws.

As an examination of Figure 2 will reveal, an arrangement of bosses and lugs with cored holes between adjacent parts has been devised so that a single screw does the work which might otherwise require two or more screws.

Thus, the back plate has a pair of protruding lugs along its lower edge in which are cored v e r t i c a l through holes with countersinks. T h e s e countersunk holes mate with small bosses on the base casting, and a pair of screws in tapped cored holes fasten them securely together. The two side panels are mounted in the same manner, and then it is only necessary to drive two screws into tapped cored holes in the upper portion of the housing to complete the assembly.

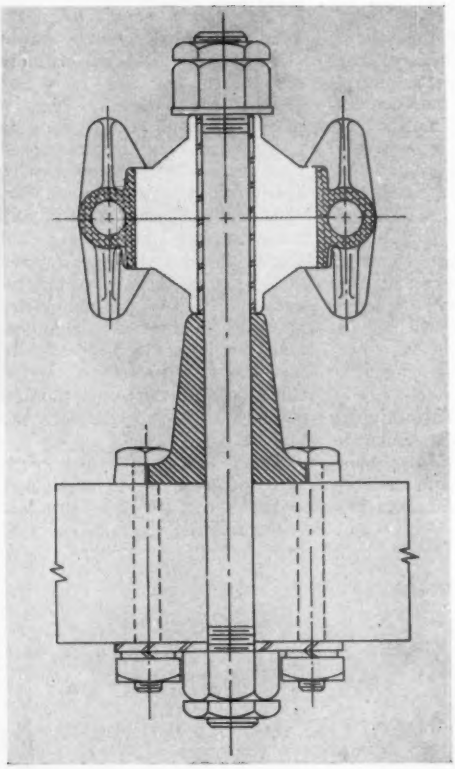
Small bosses interlock with cored holes in the die cast cover so that when the sides are fas-

(Continued on Page 58)



4. NUMBER WHEELS to stamp the minutes, hours, days, months and years are die cast. Numerals and letters are formed around the circumference by slides in the die. Some of these wheels have pinions or ratchets (or both) formed integrally.

DIE CAST PROTECT

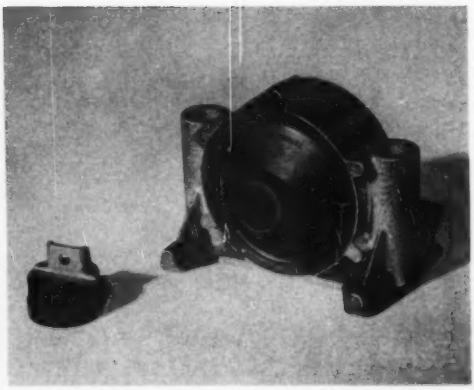


1. RUBBER FLEXING MEMBER joins the die cast bracket and the mild steel sleeve through which the ⅜ inch mounting bolt passes, as shown in this section view.

WITHIN THE PAST YEAR or so, the Lord Manufacturing Company, Erie, Pa., applied die castings to the relatively new field of vibration isolation mountings. The mountings made by the company involve a permanent bond of natural or synthetic rubber to metal.

The specific application of die castings is in a wooden shipping container for protection of delicately adjusted office machines during transit and/or handling.

Simplicity in manufacturing —and lower production cost— were the main reasons for choosing die castings. The present design allowed the unitary construction of the shock mounting, with an inner member consisting of a mild steel sleeve and an outer member consisting of a die cast bracket joined by a molded rubber flexing member, as indicated in the drawing, Figure 1.



2. SMOOTH INNER WALL of the 2½ inch cored hole facilitates the bonding of the rubber flexing member. The smaller piece shown here is a vibration isolator used as a foot mounting in an electrically operated office machine.

MOUNTINGS DELICATE SHIPMENTS

The one-piece design avoids a complicated assembly such as would have been needed with a stamped steel type of fabrication. If the bracket were stamped, much closer tolerances would have been required for pressing the bracket over the tubular inner member. As is a well-known fact in product design, the closer the tolerance requirements, the higher the cost is likely to be.

The smooth inner walls of the aluminum die castings have also been found to facilitate the bonding of the flexing element. The aluminum alloy being used conforms to ASTM B85-46T (SC7) which is a silicon-copper alloy.

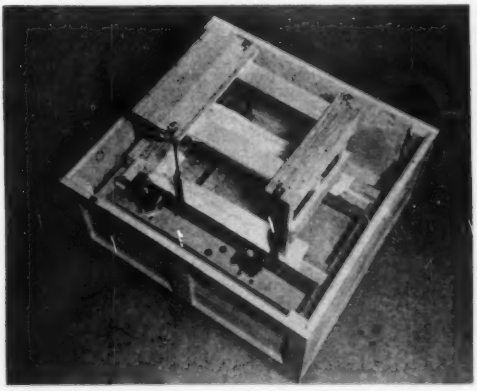
The electric office machines shipped in the wooden containers (an engineered design specially developed for this purpose) weigh between 200 and 300 pounds each. For shipping, the machine is set on the cradle in the container and the cradle is connected to the box by use of the die cast-bonded rubber mountings, one at each of the four corners.

The die casting, Figure 2, has a 2½ inch diameter cored hole in the center, within which is bonded a synthetic rubber flexing section. The smooth wall of the cored hole requires no machining as preparation for bonding the flexing element. The steel tube inside the flexing member receives the bolt for attaching to the box.

A cored through hole, 7/16 inch in diameter and 2 inches long, on each side of the die casting serves to attach the mounting to the cradle by the use of two bolts. A malleable iron pedestal is at the bottom of the

RUBBER BONDED TO DIE CASTINGS

The use of die castings is profitably extended to the field of rubber shock mountings. Such shock and vibration isolators in a shipping container are more than paying their way: heavy office machines are so securely cradled that at the end of overseas export travel no delaying adjustments need to be made on the intricate mechanisms.



3. WHEN BURROUGHS Adding Machine Company redesigned one of its typewriter-adding machines recently, it also had to work out a new shipping crate for the new model. Main problem: protection against impact that would knock the fragile machine out of kilter. For cushioning, several shock mountings constructed of die cast aluminum with rubber flexing member are installed in the crate to cradle the machine. For this shipping container, Burroughs was awarded a prize in a recent Philadelphia packaging competition.

box, and the die casting is attached to it by a 5/8 inch bolt, as shown in the drawing.

Since the office machines are cradled in the rubber in this shear mounting, they do not touch the box.

Finishing of the die cast pieces consists primarily of sand blasting to remove flash and clean the surface, followed by a chemical immersion treatment.

The office machine manufacturer ran tests for about a year with this type of mounting. The boxed machines were subjected to vertical drops of 36 inches and side drops of seven inches with no breakage or maladjustment resulting. The condition of machines noted at the end of long-distance shipments were also completely satisfactory. The arriving machines could be taken out of the container, plugged in and operated—an extraordinary accomplishment with the delicately adjusted mechanisms having thousands of parts.

Vibration Isolator Is Foot Mounting for Unit

A somewhat different die cast-bonded rubber vibration isolator, also made by the Lord Manufacturing Company, is used as a foot mounting in an electrically operated office machine, and is designed to prevent the transmission of noise and vibration to the supporting structure and the furniture on which it rests.

This vibration isolator, also shown in Figure 2, is die cast to avoid a two-piece stamped construction which would necessarily have involved a difficult assembly operation.

The main face of the die casting is a flat washer having two notches, one on each side, to allow for assembly to the mating portion of the base. Cast integral with the washer is a vertical flange which has a cored hole for attachment to the mechanism. The over-all thickness of the piece is 17/32 inch.

This die casting is produced in a zinc alloy. The simple finishing treatment is similar to that indicated for the rubber shock mounting for a wooden shipping container.

The layer of rubber is applied to the foot mounting under heat and pressure, with a flat steel disc incorporated in the bottom.

WORTH MONEY...

- **REAMING 2000 HOLES PER HOUR.** How V-M Corporation puts air cylinders to work to get more rapid machining of die cast parts is described in an article on page 45 of this issue.

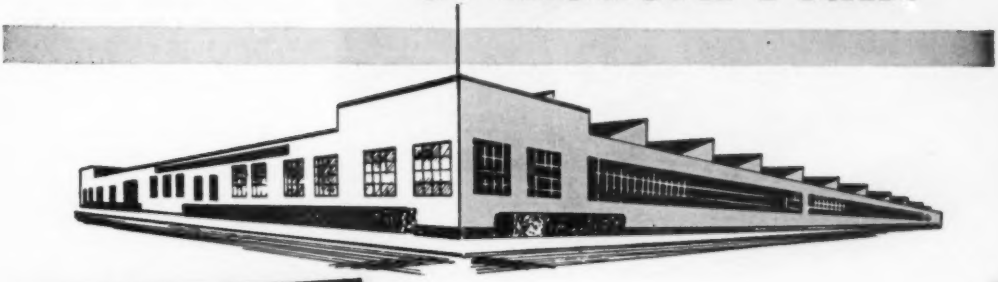
- **REMOVING SILICON SMUT** from die cast aluminum after cleaning. Methods of accomplishing this are included in a comprehensive article on cleaning methods for aluminum by D. F. Seymour beginning in the February issue of DIE CASTINGS.

- **MILITARY USES FOR DIE CASTINGS.** A survey article beginning on page 32 reviews some of the many important assignments given to die cast components during World War II. Army, Navy and Air Force all were able to use large quantities of die cast parts.

- **SOME NEW PRODUCTION AIDS.** Many new and useful production tools and methods are summarized beginning on page 46. Some of these are: large volume tumbling barrel reported to give bright luster on non-ferrous parts . . . a spray-type cleaning tank suitable for petroleum, emulsion and light cleaning compounds . . . a special die and plunger lubricant designed especially for aluminum die casting machines . . . methods of protecting and repairing tapped threads . . . and many others.

- **SOME POINTERS ON CLEANING DIE CAST PARTS.** This month's Production Clinic beginning on page 39 is devoted to some pointers on cleaning methods for assuring a suitable surface before plating.

Over 80,000 Square Feet of Modern Plant



PARAGON DIE CASTINGS are all the name implies—excellent in structure—outstanding in appearance—unsurpassed in design.

Our modern plant has every facility for precision workmanship that reduces assembly and machining costs to an absolute minimum.

PARAGON
ALUMINUM AND ZINC BASE
DIE CASTINGS

Consult any of the offices listed below or write us direct for information on how to increase the salability of your product by die casting.

QUALITY PARAGON CAST DIE CASTINGS

PARAGON DIE CASTING COMPANY

5853 WEST DICKENS AVENUE CHICAGO 39, ILLINOIS

SALES OFFICES: DETROIT • INDIANAPOLIS • MILWAUKEE • CHICAGO

1. EASY TO CLEAN due to the smooth surface of the die cast aluminum, this burner cap for a domestic gas range represents a great improvement in the appearance and styling of today's kitchen equipment. Position of ports along the sides eliminates problem of clogging due to food spillage.

GAS BURNER CAPS

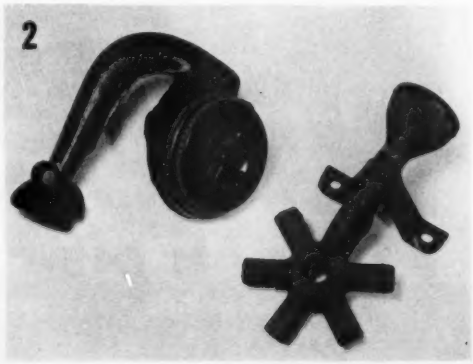
By D. D. BURNSIDE
Chief Product Engineer
W. J. Schoenberger Company

DIE CAST BURNER CAPS for domestic gas ranges began replacing cumbersome and heavy sand cast caps more than 20 years ago, and today they have been adopted almost universally by the industry. It is estimated that 90 to 95 per cent of domestic gas range top burners are equipped with die cast caps. This trend is exemplified by the manufacturing experience of our company which produces valves, fittings and die cast burners and caps for gas ranges.

There are many good reasons for the popularity of the die cast aluminum unit.

1. Having approximately one-third the weight of a comparable sand cast iron cap,

2. FORERUNNERS of today's sleek polished aluminum burner caps are these cast iron jobs. First came the star-shaped unit with its clumsy appearance and inefficient heat distribution, followed by a circular cast iron cap with radial ports laboriously drilled.



3. ULTIMATE IN BURNER DESIGN is the die cast cap mounted on a die cast base, as shown at *left*. Smooth interior surfaces of the base reduces unwanted turbulence.

4. CORED HOLES ARE OPTIONAL in the burner caps shown at *right* with small cored holes and at *left* with cores removed from die. Shape of radial ports is very accurately controlled.

means less weight to receive, handle in fabrication and pay charges on.

2. With the die cast part, close dimensional control is obtained for proper function, resulting in a satisfactorily uniform distribution of the air-gas mixture through the burner ports.
3. The polished burner cap is a decided sales point of today's dressed-up porcelain enameled ranges.
4. In actual service, spillage from cooking food is easily wiped away and the glossy surface of the burner restored.
5. Because of the inherent accuracy of the die casting process, a minimum of machining is done, contributing to lower unit cost.
6. Adaptability is another advantage, inasmuch as the die cast caps are designed to fit sand cast heads or bases.
7. Better heat transmission and faster cooling are also obtained through the die cast parts.

A more recent development—going back about ten years—has been the complete die cast burner base with cap which has so far been installed only on the more elaborate type of ranges.

The steps leading up to the development of the present-day compact burner caps reflect advances made by the gas range industry from the standpoint of a more efficient and attractive product.

The old-time star-shaped cast iron burner had the ports drilled vertically. Besides the machining costs, this required a large casting for uniform heat distribution (to bring the flames to the outer edge of the cooking vessel). When spillage occurred, the ports easily became clogged, interfering with burner function.

The first step in the direction of a modernized, efficient burner was the circular sand cast cap designed as a separate unit to be assembled to the base. With the ports drilled radially around the cap, this unit gave even heat distribution under the cooking utensil, and the burner could be made smaller than its star-shaped predecessor. The sand cast cap was attached to the base by a bolt or a threaded section.

With the advent of the die cast cap, the drilling of the ports could be eliminated altogether. The ports are formed as a series of closely spaced channels on the underside of the burner cap. The ports are completed when the cap is mounted on the faced surface of the burner base.

By casting the ports as an integral part of the cap, it is possible to have accurately shaped apertures of precisely controlled dimensions. The flames obtained with the uniform flow of air-gas mixture through these ports produce an even distribution of heat. The efficiency of the 2¾ inch diameter die cast cap generally exceeds that of the 5 to 6 inch star-shaped burners which it has replaced.

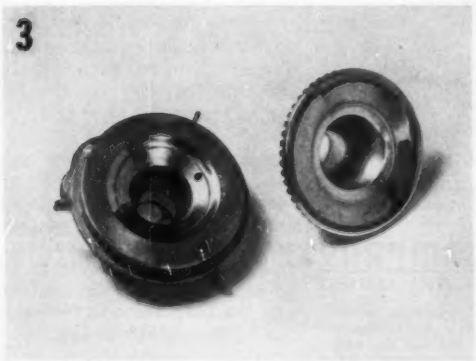
An important feature of the burner ports designed by our company is that the die cast unit is suitable for all types of gas—natural, bottled or manufactured.

Turbulence Eliminated

For optimum control of gas and distribution of pressure, the burner base has been produced

FOR COMPONENTS THAT WITHSTAND THE HEAT

Die cast aluminum is used in a number of special applications where close contact with gas or electric heat is a factor. Thus, in addition to caps for burners used on domestic gas ranges, die cast aluminum parts are used with heating elements cast as inserts for space heaters and electric iron sole plates. Aluminum cooking pots and pressure cookers are also die cast in aluminum by several manufacturers.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4

as a die casting. This process offers a smoothness of the interior walls which does not require finishing of any kind.

The rough interior of a sand cast head, on the other hand, tends to create turbulence in the air-gas mixture where it is not wanted. Also, dimensional variations which are common in sand castings tend to result in shorter flames on one side of the burner than on the other, giving uneven heat distribution.

While a degree of turbulence is desirable in the mixing tube (to aid in mixing the air and gas) this is not desirable in the interior passages of the burner head. Hence, the importance of a smooth-walled interior obtained by die casting the head.

Another important production economy is that vertical center ports in the cap, when desired, are cored through radial pads, thus saving machining.

If a purchaser specifies caps without center ports, as some do, then the core pins are simply omitted from the die. The only machining on these caps, then, is the drilling and tapping of two small holes for mounting the cap to the base.

Three spacers cast on the flange of the base are designed for centering the aeration bowls

5. WITH HAND BUFFING, it would take from three to four operators (depending on their skill) to buff the 4000 burner heads which this automatic machine produces per eight-hour shift. Machine operator merely loads and unloads the jigs with a rhythmic motion.

which control the flow of secondary air to the burner. The term secondary air refers to that air which surrounds the flame at the burner head.

Minimum Machining, Finishing

The caps are produced in two designs—flat and conical. The alloy used for all units is ASTM B85-46T (S4). This is a copper-silicon alloy of aluminum.

The flat cap is bolted to a bar across the center hole of the sand cast base, whereas the conical cap is attached by means of a threaded section at the end of a downward extending center tubular section.

On the flat caps, the center ports are drilled radially inward, and a bolt hole is tapped in the center of the underside for fastening the unit to the bar on the burner base.

Bright finishing is also simple. Polishing and buffing are done on a 4-wheel automatic machine with separate fixtures used for flat and conical caps. One wheel in the cycle is for polishing, two are for buffing and the fourth one is for coloring. The contours of the wheels

(Continued on Page 36)

Melting Kettles

...made of special heat resisting alloy iron for melting of Zinc, Aluminum, Lead, Babbit, Die Cast and other non-ferrous metals.

For detailed information on our complete line of die casting equipment, please write for Catalog No. 101.

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A Review of

SOME MILITARY USES FOR DIE CASTINGS

DURING the five years that have elapsed since the end of World War II, American industry has been almost entirely engaged in the production of civilian goods. The picture has changed drastically, however, since the start of the Korean difficulties, and once more industry must plan for defense production on a major scale.

It is reasonable to assume that the die casting industry will have its share in this production. As many will remember, this was not immediately the case in the last emergency. There was a good deal of doubt in the minds of many concerned with government procurement about a die casting's ability to take the rugged wear and tear that is generally accorded military equipment.

By the end of the war these doubts were overcome, and die castings were not only being used in equipment subjected to violent abuse, but were also used in equipment where dependability was essential, as in the case of an aircraft oxygen system, where failure meant the probable loss of plane and pilot.

Certain factors, however, should not be overlooked. Zinc, aluminum and magnesium, already in short supply because of peak consumption and government stockpiling, will become even more scarce with the addition of large defense orders. Zinc of 99.99 percent purity, for instance, which is necessary for good, sound castings, is also an ingredient of cartridge brass, a high-priority alloy. The low percentage of waste associated with the die casting process may well enter into this question.

In order to get some ideas of the place die castings will occupy in future military production, it might be helpful to review some of the applications in which they were used in World War II. The following examples have been chosen to illustrate the variety of items which had component die cast parts.

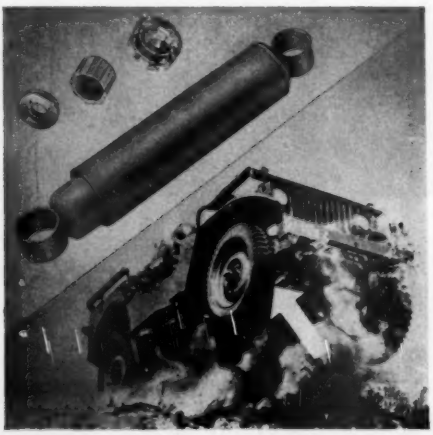
★ ★ ★

In a tank ventilating unit, designed to perform either as an intake or exhaust valve, the assembly consisted of five zinc die castings. No fasteners were used, the dimensional accuracy of the parts being such that the parts were assembled with a snap fit.

★ ★ ★

Several die castings were used in the make-up of the Army's flame thrower in order to get mass production on short notice. In order to line up corresponding slots in two mating pieces, the grip

RUGGED IS THE WORD for the treatment jeep shock absorbers received. It is difficult to find an application for die castings that would require more durability and shock resistance than these zinc die castings needed.



was die cast with an external thread so that the lead would always start at the same place. This would be impossible with a machined thread.

* * *

When the Navy revised the fire-control communication systems for battleships, die castings were specified in the new designs. This resulted in the elimination of 46 parts previously stocked because each die casting took the place of two or three parts.

* * *

The front piece of the P-40 air intake was a die casting. One would tend to think of this as a sheet metal assembly, but the die cast part was more rigid, and because of the faired curves, it would have been impossible to stamp the part in one piece.

* * *

One of the large and early users of die castings among the services was the Ordnance Department. Fuse assemblies were among the first applications. The assembly had to be accurate, it was in some ways intricate and it had to be available in large quantities during war-time. Die castings performed so well in this role that they were soon given others. In one incendiary bomb, for instance, the fuse assembly, tail plug and body casing were die castings, with only the tail fins remaining as stamped assemblies.

* * *

The high strength-weight ratio of aluminum and magnesium made them ideal materials for use in aircraft parts such as valve housings, hinges, brackets, electric motor housings and aircraft hardware of all kinds. The valve housing of the anti-gravity suit, for instance, was a die casting. The change from the sand casting previously used not only saved many hours of machining on this part, but also eliminated outside tubing by a coring process impossible in sand casting.

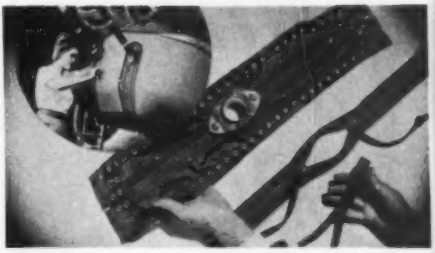
* * *

An artificial horizon was built which was really five instruments combined in one, yet it had to be light and wieldy enough to be used as a hand instrument. Thin walls and high strength made magnesium die castings a logical choice, and 13 of them were used to produce an instrument weighing only 3½ pounds. In the interest of strength, accuracy and rigidity, all parts were assembled around one large, rugged casting. The interior mechanism was fitted into a rectangular hole in this casting, with a clearance of 0.030 on all sides. This hole would have been very difficult to machine, but was easily cored in the casting.

* * *

The head of the Army's land mine detector was originally a sand casting. A switch was made

DON'T TREAD ON ME! This anti-personnel mine was composed almost entirely of die cast parts. These mines were produced in large quantities at a comparatively low cost. Note the cast-in threads on the cap.



WEATHER PROTECTION was provided for the nose guns on the B-17 by the use of gun covers with die cast zippers. The process used involves casting the zipper directly on the material. Other applications for these zippers were aircraft engine covers, artillery piece covers and canopies for trucks and half-tracks.

FIRE EXTINGUISHING in tanks and other combat vehicles was accomplished by a system using these zinc die castings. The system had a heat-sensitive element which warned the driver, who could then release CO_2 in the engine compartment by remote control.

to die casting in order to step up production, eliminate much machining, and reduce weight.

★ ★ ★

A small radio which could be carried in the hand was built for use by soldiers in the field. A die casting 11 inches long, 0.050 thick and of complicated interior shape was used for the body of this radio after other forms of fabrication had been tried and found wanting.

★ ★ ★

Die cast aluminum wheels were made for the light planes used by the artillery for spotting. These wheels withstood radial loadings of 5,000 pounds. The sections were thinner than possible in sand casting, and in addition gave uniform weight.

★ ★ ★

In housings and frames for aircraft instruments, dimensional accuracy was demanded along with intricate interior shapes and sturdy construction. Frequently it was necessary to have an air-tight and non-magnetic housing, also. No other form of manufacture could afford the economies in this case that die castings offered.

QUICK INFLATION of this Navy life belt was accomplished with the die cast valves shown on the front of the belt. The valves were used for automatic or manual inflation and deflation of the belt.

★ ★ ★

Canadian tank manufacturers, short on trained personnel, turned to zinc die castings for the major components of a tank periscope. The need for large sand casting facilities and many experienced machinists was eliminated.

★ ★ ★

Aluminum die castings were used in the Jack & Heintz Auto-Pilot and reduced its weight by one-third. The company estimated a saving of a quarter of a million dollars in reduced machining, material and overhead costs.

★ ★ ★

SAFETY IN FLIGHT was provided for R.A.F. crews by these die cast parts, which made up a safety device for aerial bombs. In flight, when released from the plane, the vanes on the top casting caused it to spin and unscrew, exposing the fuse striker. The vanes on this casting were formed by use of an interlocking die.

Jim just scooped a competitor (and *you* can, too) by taking advantage of the economies of BADGER DIE castings.

●

Long the choice of engineers who demand *exactness* and *quality*, BADGER DIE CASTING, with its expanded facilities, today offers service *better* than ever before . . . die castings WHEN and AS you WANT them!

BERT E. SANDELL, STEWART METALLURGIST, DIES; WAS ACTIVE IN TECHNICAL GROUPS

Bert E. Sandell, chief metallurgist and assistant superintendent of the Stewart Die Casting Division of the Stewart Warner Corporation, Chicago, died of a heart attack on November 14. He had been ill and working only part time for just a year.

Mr. Sandell's entire industrial experience was with Stewart in the die casting industry. Starting in as an assistant chemist, he earned a bachelor of science degree in chemistry at Lewis Institute the hard way, going to school nights and part time.

He had served as chairman of the Chicago section of the American Institute of Metallurgical Engineers and had been a director of the Chicago chapter of American Society for Metals. He was, at the time of his death, chairman of the Technical Committee of the American Die Casting Institute. He was also secretary of sub-Committee II of Committee B-6 of the American Society for Testing Materials on zinc base alloy die castings.

During the war he was a member of the Technical Industry Advisory Committee of the War Production Board and headed up the Co-ordinating Committee on the production of magnesium incendiary bombs.

His widow, Pearl Mitchell Sandell, three children, William, Robert, and Mrs. Jeane Kerst, and five grandchildren survive.

KENLY IS SALES HEAD FOR NEW JERSEY ZINC

Robert G. Kenly has been appointed general sales manager of The New Jersey Zinc Company and The New Jersey Zinc Sales Company, effective January 1, 1951.

Mr. Kenly will succeed Ralph M. Neumann who retired on December 31, 1950, on account of his health, after 41 years of service with the company.

ADD TWO TO BOARD

Charles J. Soss, president of the Soss Mfg. Co., Detroit, has announced the election of Scott Carpenter and Frank W. Donovan, both of Detroit, to the company's board of directors, increasing the size of the board from three members to five.

NEW SOUTHWEST AGENT JOINS CHICAGO-LATROBE

Mr. Bernard Stapp has joined the sales organization of Chicago-Latrobe, Chicago, according to M. O. Erickson, assistant to the president. He will handle the company products, carbon, high speed and tungsten tools, in the southwest section of the country, with headquarters in Fort Worth, Texas.

Glenvale "on grade" zinc die castings are produced in accordance with ASTM specifications and are quality guaranteed under The Certified Zinc Alloy Plan which assures you of obtaining uniformly dependable castings.

Glenvale, as a licensed producer, also provides complete modern facilities to trim, machine, plate and paint to your requirements.

Your inquiry is invited. Call or write for quotation.

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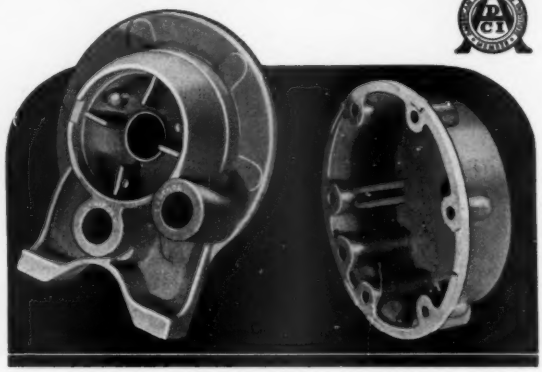
OPTIMUS PURCHASES RIGHTS OF CIRCO PRODUCTS

Melville Morris, president of Optimus Equipment Co., Matawan, N. J., has announced the purchase by the Optimus Company of the trademarks, patents, sales rights, etc., of the Circo Products Corp., of Cleveland, Ohio, manufacturers of metal parts cleaning and degreasing machinery.

According to Mr. Morris, the Circo manufacturing operations will be moved to Matawan immediately, where the manufacture and sale of Circo equipment and degreasers will be carried on as the Circo Division of Optimus. The present Circo distribution set-up will be continued and expanded. Optimus Equipment Company is a subsidiary of Hanson-Van Winkle-Munning Company.

JOINS METALS FIRM

Russell B. Weil has joined Franklin Metals Company, Newark, N. J., according to an announcement made today by Ralph Franklin, president. Formerly assistant purchasing agent of Nassau Smelting & Refining Co., Mr. Weill will serve as buyer and seller of metals for Franklin. The firm deals in aluminum, brass, copper, zinc and other non-ferrous scrap.



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Quotations On Blueprints Will Be Prompt

DIE CASTING DIVISION
The Cleveland Hardware & Forging Co.
Established 1881
3256 E. 79 ST. CLEVELAND 4, OHIO

GAS BURNER CAPS

(Continued from Page 30)

are designed to conform to both the relatively flat planes of one type of cap, and the somewhat concave surface of the other.

In checking the completed units, the inspector inserts a mandril through the center ports to make sure that they are not obstructed by lint or remains of buffing rouge. A quick brushing is given the toothed undersurface to clean it of any foreign matter that may be lodged in the ports. Checking for flatness is done with a dial indicator.

INCORRECT LISTING

Incorrectly listed among the clients of Carl Otto, industrial designer, on page 39 of the November issue of DIE CASTINGS was the name of Frigidaire. This company is a client of Raymond Loewy Associates with whom Mr. Otto was formerly associated.

This error is the result of an editorial misinterpretation. Mr. Otto formerly supervised work on this appliance line as a member of the Loewy organization until he opened his own design firm in 1949. The Frigidaire assignment is now in the hands of Mr. Loewy's partner, A. Baker Barnhart.

ROBERTS ROUGE APPOINTS PERKINS SALES MANAGER

Theodore F. Onkey, president of the Roberts Rouge Company, Stratford, Conn., announces the appointment of Arthur L. Perkins as sales manager. Mr. Perkins was formerly associated with the Minnesota Mining & Manufacturing Company and also with Hammond Machinery Builders.

FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface treatments on the die casting alloys.

AL FINISHING . . .
METAL STRIPPER — A
An outstanding development for stripping defective electroplated nickel, copper, silver, cadmium and zinc from steel. Fast action . . . no basis metal attack. The highly polished grill cover illustrated has been completely stripped of nickelplate, and is ready for re-plating without repolishing.
EBONOL BLACKENING PROCESSES
Ebonol finishes are used to beautify a widely diversified list of superior quality products. Photo shows steel parts blackened with Ebonol-S and S-30; copper and brass with Ebonol-C; zinc with Ebonol-Z. U. S. Patents — 2,364,993, 2,460,896, 2,460,898.
EMULSION CLEANER — 75
Oils, greases, buffing compounds, solid particles, deep seated in steel parts are cleaned out and completely removed by this emulsification process. Stubborn, gummy substances on die castings, milling machines, floors, motor blocks emulsify and disperse in water instantly.
ENAMEL STRIPPERS
Enthone has over 20 strippers for removing organic finishes — synthetic enamels, lacquers, vinyls, japans. The best strippers, tailor-made for your particular problem, are selected by laboratory technicians after test runs. This service is rendered free of charge.

PRODUCTION CLINIC
for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.

CLEAN SURFACES IMPORTANT IN FINISHING DIE CAST PARTS

PLATED COATINGS applied to uncleaned or poorly cleaned die cast surfaces will be found to be poorly adherent. The surface must be free from grease, dirt and reaction products from the cleaner if satisfactory adhesion is to be attained.

Proper cleaning involves the complete removal of the dirt and grease picked up during fabrication and handling, as well as the removal of oxide and other films developed during storage or in the cleaning operation.

Brass, zinc and other non-ferrous metals ordinarily can only be subjected to reverse current cleaning for a short time. For this reason it is important to preclean non-ferrous metals by an acceptable method to avoid long cleaning cycles in alkaline cleaners. One of the following methods is usually used in electrocleaning non-ferrous metals[1].

A.) *Cathodic*—Clean with direct current, which means that the non-ferrous parts serve as cathode, in a tank of hot alkaline solution. This method is safe for buffed surfaces because direct current cleaning generally does not attack or tarnish them. There is the disadvantage that non-ferrous metal ions and positively charged colloids or soaps may be attracted to the cathode and "plated out" as a loose smut on the metal surfaces. Methods B and C discussed below usually give best results.

B.) *Cathodic-Anodic*—Clean with direct current, then apply reverse current for a few seconds in the same solution. The reverse current removes any smut or film adhering to the parts, but has the obvious disadvantage of contaminating the alkaline solution with them, so that they "plate out" on the next batch of parts when direct current is applied.

As the contamination of the solution increases, longer periods of reverse current are required to remove the smut. This makes it necessary to discard the cleaning solution more frequently.

This method can be improved by using two tanks. The direct current cleaning can be done in the first tank. The parts are then transferred to the second tank and reverse current is applied for a few seconds.

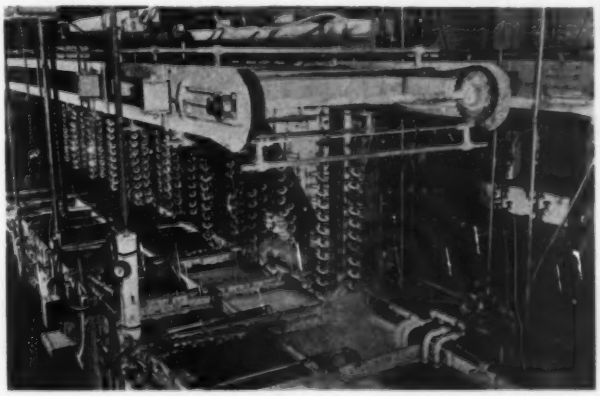
C.) *Soak-Anodic*—Soak the parts for a few minutes in a specially designed alkaline cleaner; then apply reverse current for a few seconds. This has been found effective for removing stubborn deposits from brass and zinc alloys.

This method can also be greatly improved by using a two-tank sequence, one for the soak operation and the other for the reverse cleaning treatment. As in method B, the bulk of the dirt will be confined to the first soak cleaning tank.

The following properties of non-ferrous metal electrocleaners have been given[1] as important for successful production line use:

1. *Effective Detergent Action* is required to speed the emulsification, suspension and removal of oils, buffing compounds, and other films on the metal surface.
2. *Inhibition to Prevent Tarnishing* by the oxygen dissolved in water or released during reverse current cleaning.
3. *High Conductivity* that makes more of the current available

Figure 1. CLEANING SIDE of automatic cleaning and plating machine for handling a variety of brass parts at Crown City Plating Company, Pasadena, Cal. Cleaning begins in soak tank *right foreground* and ends in rinse tank at rear. Soak cleaning is done first in two tanks, with direct current in third tank and reverse cleaning in fourth tank. Photo courtesy Oakite Products, Inc.



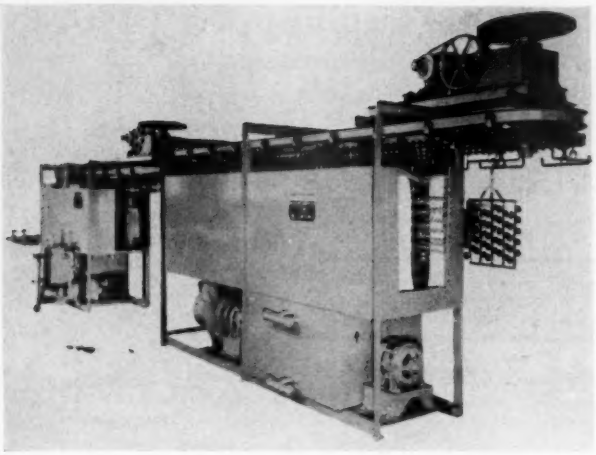


Figure 2. TYPICAL OVERHEAD CONVEYOR type metal cleaning and drying equipment. This type of equipment is used for lacquered parts which may be conveniently carried on overhead racks. Photo courtesy Metalwash Machinery Corp.

for cleaning action.

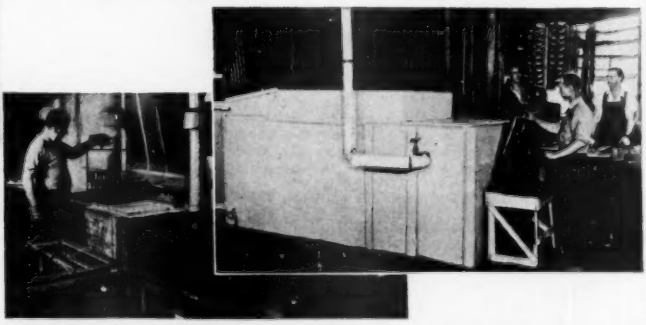
4. *High Tolerance for Chromic Acid* unintentionally brought into the cleaning solution.
5. *Complete Rinsibility* with no surface scums or hard-water soap films to cause water-breaks in the subsequent acid dip.
6. *Long Life of Solution* based on high tolerance for soils, thereby permitting efficient cleaning even though contamination becomes fairly heavy.

Cleaning Brass and Copper

One production man handling large quantities of different brass alloys has stated[2] that the best guarantee for securing good plate adhesion is to employ reverse current in the final cleaning bath. Figure 1 shows the cleaning side of the automatic cleaning and plating machine used in the above operation. The cleaning cycle begins in the soak tank and ends in rinse tank at rear. Soak cleaning is done in the first two tanks, direct current cleaning is done in the third tank, followed by reverse current cleaning in the fourth tank.

The cleaner used must provide the desired protection against tarnish during reverse cleaning. Although this tarnish can be removed by an acid dip, it may be uneven and also may cause the acid to stain the untarnished portions. Naturally, this shading of the

Whether Your Finishing Production Be Large or Small
BLACK MAGIC FINISHING PROCESSES
Will Adequately Fill Your Requirements



Black Magic blackening processes, the proven black oxide finishes for firearms, magazines, grommets, etc., are again being used for military requirements, meeting Army, Navy and Air Force Specifications for this type of black oxide finish. Black Magic is readily adapted to fully automatic or hand-operated operations.
Send for the catalog containing complete details. Our field engineers are available to assist you with your problems.

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MODERN METAL FINISHES
• 2446 E. MAIN ST., STRATFORD, CONN. •
BLACK-MAGIC OXIDE BLACKENING SALTS
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ACROMARK
MEANS "ACCURATE MARKING"

ENAMEL FILL YOUR DIE-CAST PARTS with
THE ACROPRINTER
Reg. U. S. Pat. Off.
Write For Latest Literature

Hand and Motor Driven Models
The ACROMARK Company
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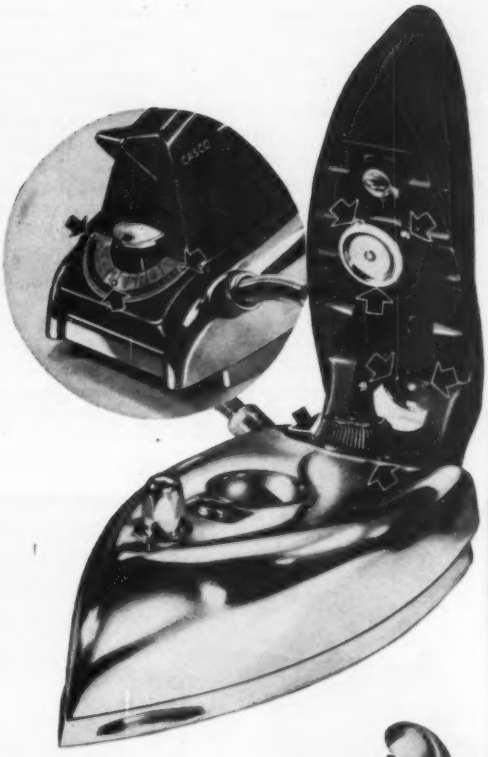
"The Original Marking Specialists"

How to make PLANNED assembly savings PAY OFF



AVOIDS 17 TAPPING OPERATIONS
Casco Products Corp. product engineers looked beyond smart appearance and trouble-free operation in planning the Casco Steam and Dry Iron. They recognized the economy and extra security of Self-tapping Screws for 17 fastenings. They also specified "Parker-Kalon" to make sure the planned savings would not be lost by screw failure and spoiled parts in production assembly. Nine P-K Type F Screws fasten internal parts to die-cast aluminum. Two P-K Type F and six P-K Type U Screws fasten external parts to the Bakelite handle. All screws are power driven. Type U Screws are driven three at a time in a power press.

Manufacturers of America's best-known products recognize that the actual cost of fasteners depends, never on price, *always* on performance. They know it's common sense to get the best Self-tapping Screws money can buy.

Don't let screw failure cancel savings

If you use the wrong type screws, if screws run offsize, break, or otherwise fail, all your planned savings will be lost in slow-downs and scrapped parts. Parker-Kalon, *originators* of Self-tapping Screws, learned long ago how to maintain the uniform quality, in every screw, that keeps assembly humming.

Let P-K* fit the fastener to the job

A P-K Assembly Engineer will help you fit the right fastener to your needs, not your needs to a certain type—because P-K make a complete line. Find out why so many thousands of leading manufacturers say—"If it's P-K . . . it's O.K." Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y. Sold everywhere through Accredited Distributors.

*TRADE MARKS REG. U.S. PAT. OFF.

TYPE Z (also made with Phillips Head)

TYPE F (also made with Phillips Head)

TYPE U

NEW FOLDER tells where to use what P-K Self-tapping Screw in Die Castings. Shows typical applications. Free on request. Ask for Form 449.

P-K TRADE MARK

The Original
PARKER-KALON* SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY

surface will appear through any subsequent bright nickel plate.

Another serious objection has been pointed out with reference to the presence of tarnish on brass prior to plating, namely, that if the formation is heavy, it will have an adverse affect on the adhesion of the electroplate and peeling and blistering have been known to occur.

Dr. W. R. Meyer has pointed[3] out that copper and brass are more difficult to prepare for bright nickel plating than for plating with other metals because bright nickel deposits reflect stains or imperfections in the base metal more readily than other plated coatings. Cleaning must be done without spotting the work; if the work is etched or tarnished, it must be done uniformly.

According to Dr. Meyer, deposits on highly buffed brass surfaces are not as adherent as on slightly etched surfaces because the flowed metal on the surface of highly buffed brass may rupture allowing the plate to flake even though the adhesion to the outermost layer of the metal is good.

Because of this, etching of brass prior to plating is sometimes done. Anodic cleaning may result in light tarnishing of the brass with the formation of an oxide that can be removed by means of an acid or cyanide dip. As long as the tarnishing is done uniformly, there will be no etch pattern noticeable through the bright nickel plate.

If pre-cleaning has been done satisfactorily, it is sometimes possible simply to use an acceptable anodic cleaning operation.

Another practice recommended by Dr. Meyer was cathodic cleaning followed by a short anodic treatment using a separate cleaning tank. When alkaline cleaning solutions for brass are made up the solution should be boiled to expel oxygen which will cause tarnishing with a fresh cleaner.

Highly buffed work generally needs only a dilute acid dip after cleaning, before plating. A common dip is 10 per cent sulfuric acid by volume. Copper alloys that have been heated may have a black oxide scale. Sodium cyanide solutions have been used to remove light scale, but hot strong hydrochloric acid solutions may be required if the oxide coatings are very heavy.

After acid dipping, the parts are rinsed and dipped in dilute sodium cyanide solution, if a cyanide plating solution is to follow. If the work is to be plated in bright nickel, it need only be rinsed after the sulfuric acid dip. Much of the difficulty with peeling of plated coatings on brass and copper base metals has been attributed to failure to preclean the surface properly prior to the alkaline cleaner.

It has been pointed out that buffed brass, when cleaned in one alkaline cleaner may build up very fast in soaps that are difficult to rinse. If such practice must be used, the cleaner should be changed rather frequently.

Cleaning Lead Alloys

Lead is an active metal chemically, and reacts quickly with alkaline solutions. Precleaning is thus necessary to shorten the time required for alkaline cleaning. Cleaners for lead alloys should use surface active materials that do not form insoluble lead soaps and the alkalinity of the cleaner should be relatively low.

It is generally good practice to do cathodic cleaning. Current densities not exceeding 25 amp./sq. ft. have been recommended as most satisfactory. High current densities may create an insoluble alkaline film at the cathode that leads to more rapid attack upon the lead alloy. Reversal of current in the cleaning solution is not advisable.

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Cleaning time should be as short as possible, usually less than one minute. It is important that work dropped to the bottom of the tank be removed immediately to prevent contamination of the cleaner.

The acid dip is also an important step in preparing lead alloys for plating. Sulphuric and hydrochloric acid dips leave an insoluble film of the respective lead salts. The best acid for dipping lead alloys has been stated[3] to be fluoboric acid. Concentrations from 5-15 per cent at room temperature have been recommended.

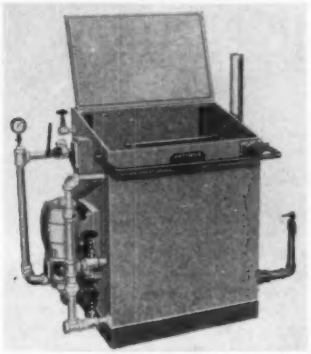

Figure 3. MANUAL SPRAY PARTS WASHER effective for intricate castings with blind passages that cannot be reached by direct sprays. Racks or individual parts can be manually agitated by lever bar outside of cabinet. By closing one drain valve, the unit can be converted into a submerged agitated washer. Photo courtesy Optimus Equipment Co.

The salts of fluoboric acid with lead, tin and other metals are soluble. After acid dipping, parts should be rinsed thoroughly and transferred directly to the nickel plating solution. If a cyanide plate is to be used, the acid dip should be followed with a dip in sodium cyanide solution.

Cleaning Zinc Alloys

Proper precleaning prior to alkaline cleaning is also important in successful finishing of zinc base die castings, particularly if parts have been buffed. In general, alkaline cleaning time should be as short as possible to do the job. Both anodic and cathodic cleaning methods are used. Current density and temperature requirements vary with the composition of the cleaner.

Concentrations of 6 oz./gal. have been recommended[3] in the operating temperature range from 180-200 F. Current densities vary from 15-25 amp./sq. ft. with cleaning times from 15 seconds to one minute. High current densities may cause local spotting of the casting. If cleaning is carried out for too long a period the casting may be etched severely causing the plate to be dull.

Cathodic cleaning is generally thought to be less sensitive to current density than is anodic cleaning. However, when the casting must be baked following plating, there are strong indications that anodic cleaning gives better results. Dilute acid dips follow the alkaline cleaning operation. A variety of different types of acid dips have been used satisfactorily[4].

Equipment

Electrocleaning tanks are often of welded steel construction and can be heated by means of a steam coil of suitable size. One desirable feature which should be considered is an overflow dam. In many cases this consists of a piece of angle iron welded for its full length against the side of the

(Continued on Page 61)

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SPOILAGE -----> goes down

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Exclusive! PROCUNIER "Tap Saver"

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NOTE YOUR LOW COST

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...when you use the **UNICHROME DIP PROCESS** *to get*

1. **Brilliant Chromium-like Appearance, or**
2. **A Barrier to Corrosion, or**
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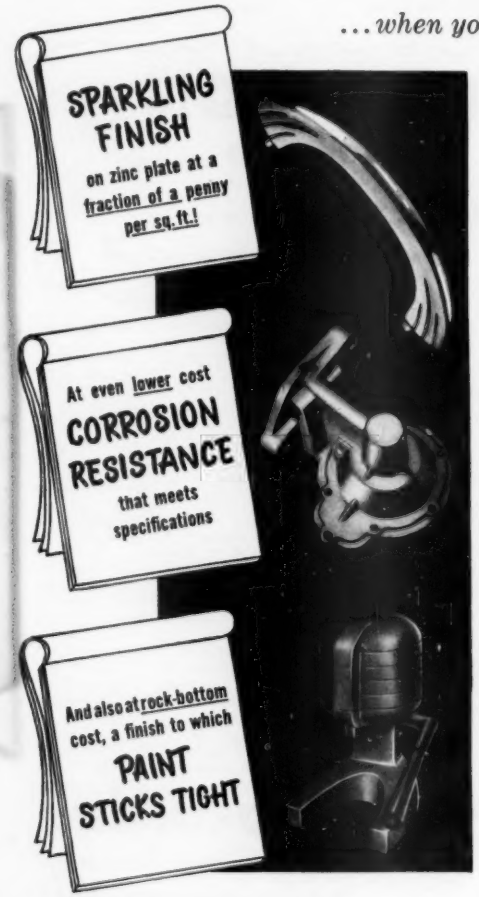
SPARKLING FINISH
on zinc plate at a fraction of a penny per sq. ft.!
At even lower cost
CORROSION RESISTANCE
that meets specifications
And also at rock-bottom cost, a finish to which
PAINT STICKS TIGHT

ONE WAY OR ANOTHER, it pays you real dividends to finish castings in Unichrome Dip. You not only improve the product, but the cost picture as well.

BRIGHT FINISHING of castings, for example, doesn't have to cost much to be really good. Consider ordinary zinc-plate treated in Unichrome Dip. It looks like chromium. And it *stays* that way because it's resistant to tarnishing and fingermarking. Yet this sales-winning, durable brightness is obtained for only a fraction of a cent per square foot of average surface treated!

IF YOU CHROMATE-TREAT with Unichrome Dip, you produce a yellow to olive drab finish on unplated castings which has even better corrosion-resistance than the bright finish. And since you use a more economical solution, *you save even more!*

DO YOU FINISH with baked or air dry coating? You'll be sure of coatings that stay put when you first condition the castings in Unichrome Dip. For this process provides the inert surface needed for continuing adhesion of paint, lacquer or enamel.

A chemical treatment, Unichrome Dip produces a finish integral with the zinc. A 5 to 20 second dip does it. Tolerating impurities, the solution is easy to control. It works equally well for bulk handling of parts or in automatic equipment.

Write for the full details. Learn what the many advantages of Unichrome Dip can do for your product

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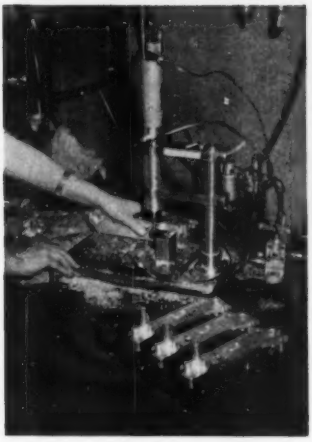


1. THIS SENSITIVE and rapid air-operated drill press, in combination with an air clamping fixture, drills a hole to precise size and depth.

2. AIR CYLINDERS are arranged to index and clamp small die castings in this fixture, loaded by hand, and to move the reamer in the chuck of a drill press down and up each time a piece is indexed into position.

AIR FOR { CLAMPING / INDEXING / FEEDING / RETRACTING

SEVERAL zinc alloy die castings are components of record changers produced in large volume by V. M. Corporation, Benton Harbor, Mich. Because of good design, including provision for coring most holes, however, only light and simple machine operations are needed.

Much of the work is done on drill presses and is noteworthy chiefly because of the unusually high speed with which parts are handled. This speed is attained partly by use of fast air clamping fixtures and by employing high speed drills arranged to complete their cycle in minimum time.

Typical of some drilling setups is that for the die castings shown in Figure 1. The parts set in the fixture by hand, one at a time under an air operated Keller drill turning at very high speed. When a button at the operator's right hand is pressed, air clamping occurs immediately and the drill instantly advances and retracts completing the hole.

When the drill retracts, the fixture unlocks automatically and the work piece is removed by hand, completing the cycle and leaving the fixture ready for reloading. With this setup, hole size and depth are held within close limits.

Small die castings of the shape shown in Figure 2 require the reaming of a cored hole near one end. This work is done in the automatic indexing fixture shown and all that the operator need do is to keep the recesses of the fixture loaded. Indexing of the fixture, clamping, feeding and retracting of the reamer in the chuck of a Delta drill press are all done by Bellows air cylinders that are inter-connected and operate automatically.

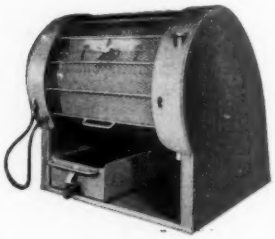
Immediately after indexing, which, of course, brings the hole into perfect alignment with the reamer, the latter is advanced and retracted, after which the fixture again indexes. Reamed pieces continue around the dial until over a hole where they are unlocked and fall out through a chute. With this arrangement, one hole is reamed in each of 2000 pieces an hour.

NEW PRODUCTS

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

LARGE CAPACITY TUMBLING BARREL

Model 48-2 Tumbling Barrel
Grav-i-Flow Corp., Sturgis, Mich.



SPECIAL FEATURES: Designed for use in grinding, de-burring and finishing metal parts. Claimed to be faster and to handle larger volume, and on non-ferrous parts to give enough luster and smoothness with Grav-i-Flow finishing chips to eliminate the need for subsequent operations such as ball burnishing. Chip surface can be changed from finishing to cutting without removing parts from cylinder.

SPECIFICATIONS: Width—5' 8", length 5' 4", height 5' 8". Two 24"x40" compartments, furnished ½" plate unlined or ¼" plate rubber-lined. Cam-lock doors have manual release safety stops. Reduced voltage control on safety starter. Lever or push-button switch. Limit switch on safety guard. 220-440 volt, 3-phase, 60-cycle motor with magnetic brake. Water and electrical attachments are integral for quick connection. Counter-balanced safety guard. Variable speed drive and timer controls optional.

For additional information circle No. 1 on the Reader Service Card.

PROTECTIVE COATING FOR TANKS

Carbo-Kote 6020
Carboline Co., St. Louis

SPECIAL FEATURES: Protective coating for lining steel or wood tanks or covering floors. Brushes on and hardens at room temperature. Proof against 30,000 volt spark test and most solvents, acids and alkalis, up to 350 F.

SPECIFICATIONS: Withstands acids, organic and inorganic, except nitric. Good for sulfuric acid to 50 percent concentration, and all concentrations of hydrochloric, hydroflouric, acetic acids, ketones, straight chain and most aromatic and chlorinated hydrocarbons. Will withstand 225-250 F on steel, 325-350 F on wood. Primer needed with concrete or steel. Three coats give a lining .036 thick, with a hardness of 85-90 Durometer, compared to 100 for steel. No toxicity or hazard in application, except for primer.

For additional information circle No. 2 on the Reader Service card.

IMPROVED CUTTING OILS

Lasupar Cutting Oils
Gulf Oil Corp., Pittsburgh.

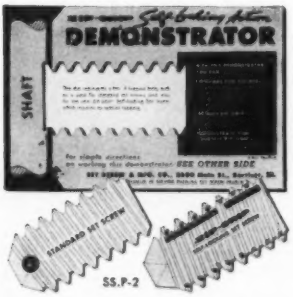
SPECIAL FEATURES: These oils have been compounded to cover a wide range of machining operations. They are said to have good anti-weld properties and high load carrying ability. Tool life has been increased an average of 25 percent in tests.

SPECIFICATIONS: Obtainable in all former standard grades of Gulf cutting oils. Includes free sulphur, sulphurized mineral oil and sulphurized fatty oil to improve anti-weld and load carrying properties. Manufactured in a range of viscosities, with selection based on type of metal, cutting feeds and speeds, type and shape of tools and chip removal.

For additional information circle No. 3 on the Reader Service card.

SELF-LOCKING SET SCREW

Zip-Grip Set Screw
Set Screw & Mfg. Co., Bartlett, Ill.



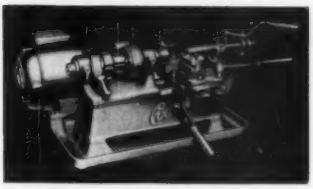
SPECIAL FEATURES: Utilizes three locking actions: seating against shaft, interference fit, "contra-thrust" action-obtained by setting forward screw threads closer together, tending to make the screw try to shrink itself. Locking action does not deface set screw or tap, thus allowing them to be used many times or removed for disassembly.

SPECIFICATIONS: Set screw is used with No. 2 tapped hole, the same as standard set screws. *(Demonstrator made of cardboard available on request.)*

For additional information circle No. 4 on the Reader Service card.

SECOND OPERATION BENCH LATHE

C. V. A. Second Operation Bench Lathe
DCMT Sales Corp., New York City



SPECIAL FEATURES: Designed for production machining operations or finishing work.

SPECIFICATIONS: Equipped with lever operated collet attachment, tailstock and compound slide. Front and rear toolholders adjustable for height and angles from 22 degrees left to 33 degrees right. Flat belt drive adjustable with jockey pulley for tensioning. ¾ hp, 220 volt, 3 phase, 60 cycle motor. Spindle speeds are 1020 and 2010 rpm. Maximum distance tailstock spindle to headstock, 2¾".

For additional information circle No. 5 on the Reader Service card.

THERMOSETTING BOND FOR DISSIMILAR METALS

Bonding Agent R-313
Carl H. Biggs Co., West Los Angeles, Calif.

SPECIAL FEATURES: This product is a medium for bonding glass, plastics, Neoprene, leather, etc., to metals of all types. Can also be used to bond dissimilar metals, including ferrous to non-ferrous metals. Cures without heat, but can be cured in 20 minutes using low temperature ovens.

SPECIFICATIONS: Chemically inert to concentrated acids and alkalis at room temperature. Has good electrical properties. Compressive strength 14,000 psi, flexural strength 7000 psi, shear strength 2500 psi. Heat resistance from 100 F to 400 F depending upon time exposed. Clamps unnecessary during either fast or slow curing process.

For additional information circle No. 6 on the Reader Service card.

WASHABLE MARKING CRAYON

Crayoff Marking Crayons
Celco Corp., Santa Monica, Calif.

SPECIAL FEATURES: This marking crayon can be used on metal, glass or wood. Can be wiped off with damp cloth without marring surface or appearance of surface.

SPECIFICATIONS: 4½" long, ½" dia. Colors are green, yellow, red, brown, terra cotta, black, blue and purple. Said to make easily readable mark. Packed one dozen per box in solid or assorted colors.

For additional information circle No. 7 on the Reader Service card.

FILTER FOR AIR LINES

Fulflo Air Filters
Hanson-Van Winkle-Munning Co., Matawan, N. J.

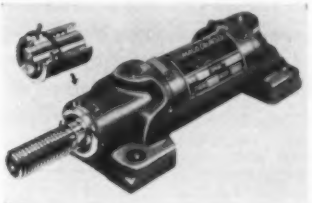
SPECIAL FEATURES: For use by electroplaters in compressed air lines for baths using air agitation, for lacquer rooms, work blow-off or other applications requiring clean, dry air. Can be serviced without removal from air line.

SPECIFICATIONS: Capacity: 125 psi maximum pressure, flow up to 60 cfm of free air. Steel construction. Head held in place with single center bolt. Filter change effected by removing one nut. Replacement cartridges available from stock in ¾" pipe size with mounting bracket. Non-corrosive deflector passes oil and moisture to sump; remaining traces are then removed by filter. Seal at top and bottom of filter prevents passage of unfiltered air.

For additional information circle No. 8 on the Reader Service card.

EASY-TO-REMOVE SELF-CONTAINED PACKING GLAND

Pemaco "E-Z-PAK" Gland
Petch Mfg. Co., Mt. Clemens, Mich.



SPECIAL FEATURES: Self-contained packing gland for cylinders can be removed and replaced without dismantling the cylinder, and in most cases, without removing cylinder from the machine.

SPECIFICATIONS: Designed to comply with J. I. C. standards. Combines bearing surface, low-friction ram seal and seal guard ram scraper into a single unit. Bearing surface is a bronze bushing on each side of the packing rings. Bronze scraper excludes abrasives and foreign matter. Uses self-adjusting metallic packing. Manufactured for both hydraulic and air cylinders.

For additional information circle No. 9 on the Reader Service card.

SPRAY-TYPE CLEANING TANK

SolVoJet
Phillips Mfg. Co., Chicago

SPECIAL FEATURES: Handles petroleum, emulsion and light cleaning compounds and toxic and non-toxic solvents. Different types of cleaning can be done by changing solvent in tank. Mounted

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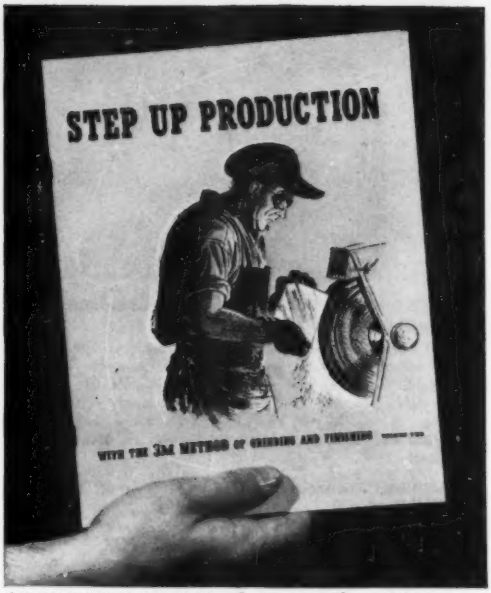

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on wheels to give mobility from job to job. Cleaning is accomplished by room temperature solvent action and the force of the pressure jet.

SPECIFICATIONS: Size-length, 38"; width, 24"; height, 36". Pressure supply by rotary pump with mechanical seals. Pump is operated by foot switch, and pressure can be regulated. Sump capacity—11 gal. Power required is 110 volts, 60 cycle, 1 phase.

For additional information circle No. 10 on the Reader Service Card.

MULTI-PURPOSE GREASE

Cosmolube

E. F. Houghton & Co., Philadelphia

SPECIAL FEATURES: A media-carrying compound for use in grease, designed to meet most grease needs in the average industrial plant. Saves time and space, simplifies lubrication, reduces errors of misapplication.

SPECIFICATIONS: Resistant to heat, cold or wet conditions. A cold-milled grease of smooth texture. Clings to all metal surfaces. Long-lasting. Available in two consistencies.

For additional information circle No. 11 on the Reader Service card

BARREL BURNISHING COMPOUND

Burnek

Wyandotte Chemicals Corp., Wyandotte, Mich.

SPECIAL FEATURES: A media-carrying compound for use in barrel burnishing brass, copper, gold, nickel and silver and some operations on aluminum and zinc.

SPECIFICATIONS: Use with steel balls or shapes, burnishing stones or chips, or for self-tumbling. Dissolves quickly and completely. Maintain metallic color. Equal performance in hard and soft water. Permits storage of steel media in solution.

For additional information circle No. 12 on the Reader Service card.

STRAIGHT SHANK T-SLOT CUTTERS

Retool T-Slot Cutters

Retool Corp., Milwaukee, Wis.

SPECIAL FEATURES: Greater side chip clearance gives free cutting action and reduced breakage. Can be used in all standard holders.

SPECIFICATIONS: Staggered teeth are undercut and conform to standard dimensions of the Simplified Practise Committee. Cutters have straight shanks, and are available in shank sizes from ½" to 1¼".

For additional information circle No. 13 on the Reader Service card.

DIE AND PLUNGER LUBRICANT

Tower S2 Compound

Tower Oil Co., Chicago

SPECIAL FEATURES: Is sometimes used as a die release agent, but principal use is for lubrication of the plunger in aluminum die casting machines.

SPECIFICATIONS: S2 is a heavy, dark, viscous fluid, having high temperature operating characteristics. Used undiluted for plunger lubrication, but can be cut with light oil or kerosene when used for die lubrication. Will frequently last for more than one shot, some users getting several shots per application. Does not cause carbonization on plunger, and will prevent plunger freezing.

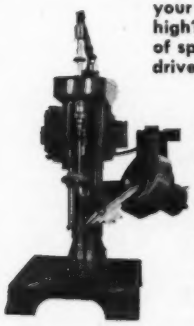
For additional information circle No. 14 on the Reader Service card.

(Continued on Page 52)

Have You An Assembly Problem?

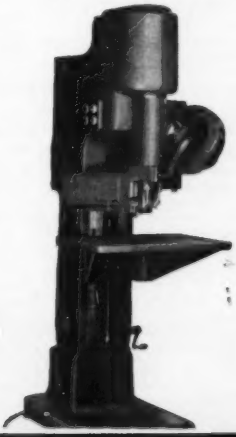
LET OUR SPECIALISTS HELP YOU

Are you still using slow uphill hand methods that keep your assembly department in low gear and labor costs in high? Discard them and get on to the rapid straight-away of speedy, inexpensive production offered by D.P.S. power-driven machines.



DETROIT POWER SCREWDRIVERS

Drive screws as fast as one a second—all types of screws—no marring of heads or stripping threads—all screws driven to uniform tension—Hopper-fed—SCREWS ALWAYS IN SIGHT OF OPERATOR—3 models, one to fit your requirements.

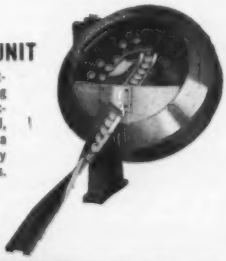


DETROIT POWER NUT DRIVER

A revolutionary new machine that drives nuts with amazing speed, either semi-automatically, or it can be adapted to full automatic operation entirely eliminating the manual handling of nuts. Capacity: nuts, ⅜" min. to 1⅛" max. across flats.

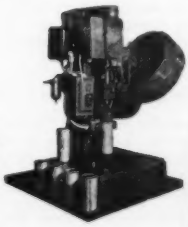
THE HOPPER UNIT

Motorized—Highly Adaptable—A selective feeding device whereby production parts are selected, oriented and fed in a given position for primary and secondary operations.



SPECIAL ASSEMBLING MACHINES

For light assembly operations using Hopper Units to feed component parts.



Write for Catalog

DETROIT POWER SCREWDRIVER CO. 2821 W. FORT ST. DETROIT 16, MICH.

USEFUL LITERATURE

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

25 **LEAD ANODES FOR CHROME PLATING:**

A folder describing sawtooth, flat and special shape lead anodes for chrome plating made by the Heil Process Equipment Corp., Cleveland, is available from the company. The folder also gives specifications for standard anode hooks.

26 **PROTECTING & REPAIRING TAPPED THREADS:**

Screw thread bushings of helically coiled phosphor bronze and stainless steel wire for protecting and repairing tapped threads are described in an engineering folder available from the Heli-Coil Corp., Long Island City, N. Y. Called Bulletin 650-4, it gives data on all types of Heli-Coil applications.

27 **GAGING CHARTS FOR USE WITH OPTICAL COMPARATORS:**

Engineer's glass, custom made and standard charts, scales and rules for use with all makes of optical comparators, and measuring and micro projectors are described and illustrated in a catalog published by the Engineer's Specialties Division, Buffalo, N. Y. The catalog also includes staging fixtures and accessories. Distribution is limited to executives, and the company asks that requests for copies be accompanied by the official title and firm or government agency of the sender.

28 **BACKSTAND BELT GRINDING & POLISHING:**

The advantages of backstand belt grinding and polishing as opposed to the set-up wheel method are discussed in a brochure put out by the Coated Abrasives Div., Armour and Co., Chicago. In addition, a description of the type of equipment needed for backstand belt work is given.

29 **KEYLESS DRILL CHUCK:**

Information on a keyless self-centering drill chuck manufactured by the Leo Hjort Co., Copenhagen, Denmark, is offered by the U. S. representative, Hauser Machine Tool Corp., Manhasset, N. Y. One feature of the product is that it may be opened by hand even after heavy drilling work.

30 **INFORMATION ON CASTING ALLOYS:**

Tabulations of specifications, chemical compositions and physical properties of various die casting and other alloys handled by R. Lavin & Sons, Inc., Chicago, are given in a booklet published by the company. Information on foundry practise and on fluxes and test bars is also given in the booklet.

31 **SHARPENING CARBIDE MILLING CUTTERS:**

"Recommendations for Sharpening Carbide Milling Cutters" is the title of a booklet offered by Cincinnati Milling and Grinding Machines, Inc., Cincinnati.

32 **CONTINUOUS BLAST CLEANING:**

The advantages of continuous, airless, abrasive blast cleaning especially suitable for castings, are given in Bulletin 454, available from the American Wheelabrator and Equipment Corp., Mishawaka, Ind. The company manufactures this equipment in five sizes, in addition to other blast and abrasive machines and supplies.

33 **CHEMICAL-RESISTING FINISHES FOR THE PLATING ROOM:**

Descriptions of chemical-resisting organic finishes based on vinyl resins, phenolic resins, fish oils, chlorinated rubber and water emulsions are found in a bulletin issued by United Chromium, Inc., New York City. The paints are compounded for use on plating and cleaning equipment, among other applications.

34 **FURNACE CONTROL INSTRUMENTS:**

A catalog of indicators, controllers and combustion safeguards manufactured by Wheelco Instruments Co., Chicago, is offered by the company. A complete line of instruments and controls is shown for operation of electric, gas or oil fired furnaces.

35 **INSTRUCTIONS FOR BRIGHT COPPER PLATING:**

Instructions for use of Wes-X addition agent for improvement of results in copper plating through elimination of organic additions are given in a pamphlet published by the Hanson-Van Winkle-Munning Co., Matawan, N. J. Included are a method of bath analysis and a test for determining local deposit thickness.

36 **DO RATINGS EXPLAINED:**

Department of Defense DO ratings for all contractors are explained in a chart prepared by the Munitions Board, Pentagon Bldg., Washington.

37 **DIE CASTING QUALITY CONTROL:**

The methods used by the Electric Auto-Lite Co., Chicago, in quality control of die casting production are illustrated and explained in a catalog available from the company. A table of alloy compositions is also included.

38 **HEAT TREATING FURNACES:**

Atmosphere furnaces for heat treating tools and dies are described in a pamphlet issued by the Surface Combustion Corp., Toledo, Ohio. Atmosphere generating equipment for use with the furnaces is also described.

39 **FAST DRYING FINISH:**

An airdrying finish that dries with lacquer speed is described in literature available from the Andrew Brown Co., Los Angeles. The coating has somewhat the appearance of a hammered finish, and can be applied to metal without a primer.

(Continued on Page 53)

OAKITE HOLDS MEETINGS

How recent developments in the field of cleaning and allied procedures are helping industry meet the demands of increased production was the central theme of a series of technical-sales meetings held recently in New York, Cleveland and Hollywood, Calif., by Oakite Products, Inc.

STANDARD VARNISH CONSOLIDATES SALES

Standard Varnish Works, New York City and Chicago, has announced the promotion of Carl Bauer to the newly created post of vice-president in charge of industrial sales. Mr. Bauer's new duties represent a consolidation of the company's eastern and western sales activities under a single administrative head.

MacDERMID APPOINTS WISCONSIN DISTRIBUTORS

MacDermid, Inc., Waterbury, Conn., has announced the appointment of Donald Sales & Mfg. Co., Milwaukee, as Wisconsin distributors for the MacDermid line of metal cleaners, bright copper and other metal finishing preparations.

D. J. MURRAY ELECTS NEW EXEC. OFFICERS

New executive officers for D. J. Murray Manufacturing Company, Wausau, Wisconsin, elected at a Board of Directors meeting are as follows: A. W. Plier, executive vice president and general manager; D. J. Everest, vice president; C. L. Durkee, director, vice president and sales manager; W. A. Marquardt, secretary; P. W. Hoeper, assistant secretary; and Grover Keeth, assistant treasurer.

The other officers of the company are F. C. Boyce, president; M. P. McCullough, vice president, and G. L. Ruder, treasurer.

The following are the members of the Board of Directors: F. C. Boyce, D. C. Everest, M. P. McCullough, A. W. Plier, C. L. Durkee, G. L. Ruder, P. W. Hoeper and Grover Keeth.

FREE

ASK FOR BOOKLET No. D-1

IF YOU PRODUCE PARTS THAT REQUIRE FINISHING OF ANY KIND

This 22-page booklet is guaranteed to open your eyes! It gives you the inside story of advanced barrel finishing as never told before!

In the last five years, barrel finishing has made rapid advances. Only those directly connected have been able to keep up. Only 30% of the nation's manufacturers are benefiting from the tremendous cost savings and improved finishes made possible by these advances.

Now is the time to investigate this labor-saving, cost-cutting method. ALMCO barrel finishing equipment has completely paid for itself in as little as two months! This is easy to understand. A single unit installation replaces from two to twelve men. Savings run as high as 95%.

"Advance Barrel Finishing" is the only mass deburring, grinding and finishing method where results are controlled. Amazing results are now possible on almost all types of parts from large castings to small intricate parts. Close tolerance parts can be finished with absolute uniformity to almost any desired micro-inch reading.

WRITE TODAY FOR YOUR *FREE* COPY

ALMCO Supersheen

AMERICA'S LARGEST MANUFACTURER OF ADVANCED BARREL FINISHING EQUIPMENT — MATERIALS AND COMPOUNDS

ALBERT LEA, MINNESOTA

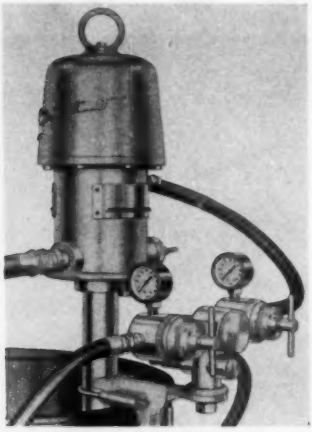
NEW PRODUCTS

(Continued from Page 49)

SPRAY-GUN PUMP WON'T SPURT

Mogul-Type Powerflo Pump

Gray Co., Inc., Industrial Div., Minneapolis



SPECIAL FEATURES: High speed, large volume, air-operated power pumps for spraying industrial materials directly from drums or buckets. Spurting in the spray gun, which causes uneven finishes, is eliminated by a device called the Evenflo.

SPECIFICATIONS: For use directly from container with spray gun, pole gun or extrusion gun. Air-operated with either large or small output capacity compressors (20-175psi). Can be used to spray rust and corrosion preventives, adhesives, sound deadeners, undercoaters and other industrial materials, including gummy mastics and non-self-leveling substances. Weighs 35 pounds. Power head is cast aluminum. Air motor of steel forgings and machined castings. "O" rings stop blow-by to provide seals in air motor. Piston has balanced double action for smooth delivery.

PRESERVATIVE FOR CUTTING OILS

Cutting Oil Additive

West Disinfecting Co., Long Island City, N. Y.

SPECIAL FEATURES: Used to slow or prevent the development of rancidity and obnoxious odors. Inhibits bacteria, stabilizes the emulsion and preserves lubricating qualities. Has increased the life of cutting oils from two or three days to three weeks in certain cases.

SPECIFICATIONS: Product is odorless. Will keep bacteria count low enough in most cases to permit disposal of cutting oils in public sewers or streams. Trial demonstrations can be arranged. *For additional information circle No. 15 on the Reader Service card.*

WATER-DISPLACING COMPOUND

Hydrolift

London Chemical Co., Chicago.

SPECIAL FEATURES: Gives a chemically moisture-free surface on all metals. Used as a dip, spray or brush-on after water rinsing of metal surfaces such as aluminum, zinc, chromium, etc. Eliminates need for water-drying operations. Prevents water-spotting, oxidizing and hydrating effects. Neutralizes finger prints. Used after pickling and rinsing, the product will prevent rust. It has no after effects, such as darkening of the metal.

WHAT'S THE BEST WAY TO CLEAN LARGE METAL PARTS?

This FREE Oakite Booklet Tells How

HERE'S an easy way to clean metal parts that are too large to be soaked in tanks or conveyed through washing machines.

Just use the Oakite Solution-Lifting Steam Gun to apply Oakite cleaning solution under 40 pounds pressure. Dirt disappears quickly, leaving parts ready for assembly, further machining, pre-paint treatment, etc. (Same gun applies Oakite paint-stripping solutions.)

FREE For illustrated folder F7338—telling more about the Oakite Steam Gun—write to Oakite Products, Inc., 34G Thames St., New York 6, N. Y.

ALSO *ask about Oakite procedures for:*

Machine cleaning	Tank cleaning	Electrocleaning
Pre-paint treatment	Pickling	Paint stripping
Barrel cleaning	Burnishing	Rust prevention

SPECIALIZED INDUSTRIAL CLEANING

OAKITE

MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. & Canada

in BURNISHING MATERIALS

it's the SHAPE that counts!

Parachute buckles and other fittings of the airman's life preserver must have smoothly burnished corners and surfaces.

When your product design requires a burnishing material which reaches into hard-to-clean corners . . . use Abbott Burnishing Diagonals. They're shaped to do the job right.

Abbott Burnishing Shapes . . . Ball, Ovalball, Cone, Diagonal, Pin . . . are scientifically designed to make effective contact on any size and shape of stamping or casting. Each is made from Abbott bearing ball steel, deep hardened and polished to a mirrorlike, glass hard finish. For *better* burnishing . . . use Abbott.

WRITE for Abbott Catalog-Manual showing burnishing mixtures and suggestions.

THE ABBOTT BALL COMPANY

1084 New Britain Ave.,
Hartford 10, Conn.

SPECIFICATIONS: Used as a cold dip, the product will lift water to the surface to run off, even from deep crevices. Dries in 15 minutes, leaving a transparent film suitable for plating, painting or other finishing. Coverage is 8200 square feet per gallon.

For additional information circle No. 16 on the Reader Service card.

ORGANIC METAL PRESERVATIVE

Saf-pHilm Rust Preventive
Swan Finch Oil Corp., New York City.

SPECIAL FEATURES: For processing tools, instruments, machinery and parts prior to storage or shipment. Resistant to abrasion and rough handling. Resists acids and alkalies. Coating consists of organic film formed by affinity or polarity for metal.

SPECIFICATIONS: Dark-colored, solvent-type compound. Forms transparent, colored film. Drying time 10 to 15 minutes. Thickness appoximately .002. Film is waxy, semi-tacky and flexible. Applied at room temperature by brush, spray or dip method. Removed with kerosene or solvent.

For additional information circle No. 17 on the Reader Service card.

BELT SURFACING MACHINES

Horizontal Type Nos. 1, 2, 3. Vertical Type Nos. 4, 5, 6
Production Machine Co., Greenfield, Mass.

SPECIAL FEATURES: Horizontal type for finishing flat surfaces. Easily controlled belt tracking and tension. Adjustable work stop on platen. Vertical type on same general construction has adjustable work table which tilts to 45 degrees.

SPECIFICATIONS: Height from 39" to 72½". Width from 37" to 60½". Depth from 24" to 67". Belt speeds from 3000 to 4580 fpm. Maximum work lengths from 15" to 36". Motor horsepower is 3 to 7½. Belt sizes range from 9" x 7'1" to 20" x 12'1". Also manufactured are Models 601 and 606, which are small bench surfacers.

USEFUL LITERATURE

(Continued from Page 50)

40 GUIDE TO BETTER PLATING:

"The Real Secret of Better Plating," a 10-page copyrighted pamphlet, will be sent to plating engineers and executives by Joseph B. Kushner, electroplating engineer, Stroudsburg, Pa.

41 GRINDING WHEEL BOND:

"79E," a vitrified bond for grinding wheels and mounted wheels, is described in a folder available from the Chicago Wheel & Mfg. Co., Chicago. Developed for grinding speeds up to 6000 rpm, the bond is recommended by the company for portable grinding of dies and other steel items.

42 DATA ON CUT-OFF WHEELS

Wheel grade recommendations and performance data as well as operating suggestions for the Delta cut-off machine are contained in a six-page bulletin issued by the Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.

43 AUTOMATIC PLATING MACHINES

Automatic, semi-automatic and special plating machines made by the Meaker Co., Chicago, are described in the company's booklet No. 148. Illustrations of machines already installed and operating are included in the booklet.

ACCURACY TO .0001"
FOR TOOL ROOM AND PRODUCTION

FOR AS LITTLE AS $117.50

IN PRECISE MOUNTS ON LATHES AND OTHER MACHINE TOOLS, PRECISE GRINDER-MILLERS WITH 1/4 H.P. AND SPEEDS FROM 20,000 TO 45,000 R.P.M. DO THE WORK OF SINGLE-PURPOSE MACHINES COSTING 100 TIMES AS MUCH!

VERSATILITY. For cylindrical, internal, external and form grinding; for milling with H. S. steel or **tungsten carbide** midget mills; for micro-finishing and polishing. Use on wood, glass, rubber, plastics, or any metal including the hardest alloy steel.

DURABILITY. All metal housing, rigid PRECISE quill, lubricant-sealed, micro-precision bearings 1/4 H. P. AC-DC motor (115 volts) is protected by replaceable fuseirons.

ATTACHABLE COOLFLEX SHAFT (optional). Quickly attached for bench work and handtool applications. Same speeds, same precision quill as in PRECISE GRINDER-MILLERS.

Write FOR CATALOG

PRECISE PRODUCTS CO., 1342 Clark St., Racine, Wis.

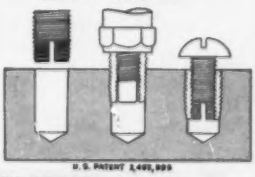
PRECISE GRINDER-MILLERS

TAP-LOK INSERT
Taps own thread—
Locks firmly in place

THE Tap-Lok Insert, of hardened steel, offers a durable threaded surface in aluminum, magnesium, die castings and other materials of relatively low shearing strength. It provides secure anchorage for screws, bolts and studs under stress loads in low strength materials and eliminates danger of thread stripping in assembling and service.

Special driving tool turns insert to tap its own thread with the edges of its slotted segments, which are forced inward slightly in tapping. Screw fastener passing into slotted area further increases locking effect of segmented insert in base material. Tap-Lok Inserts improve and safeguard your assemblies—help reduce scrap factor—reduce costs. Send for samples and literature.

Driving tool with threaded shoulder stud engages internal thread of Tap-Lok. Insert is then driven into hole like an ordinary self-tapping screw.



U. S. PATENT 2,402,903

ALSO MANUFACTURERS OF THE GROOVE-PIN—
For positive locking press fit.

GROOV-PIN CORPORATION
2017 Kerrigan Avenue
Union City, New Jersey

DIE CAST BRASS

(Continued from Page 21)

cipally to reduction or elimination of most secondary operations. Finished piece costs reflect the savings in labor and overhead burden and show a 20 percent advantage for the die cast brass over the sand cast brass.

The sand cast brush holder required cleaning and snagging of all exterior surfaces, including rough grinding. The rectangular holes which seat the brushes were broached with two or three operations, including roughing and finishing cuts. All holes were drilled and some tapped.

The die casting needs only light trimming, a single finishing cut with a broach to remove draft from the brush holes, drilling of a few small diameter or angled holes, and the tapping of holes.

The only critical dimension on the brush holder is the hole which receives the brush. This tolerance is held by broaching, although the die casting has the advantage of initial accuracy which simplifies locating and reduces metal loss in chips.

Although all new motors are built with the die cast brass brush holders, they are designed to be interchangeable with the previous sand cast or die cast zinc units so that those already in service will not become obsolete.

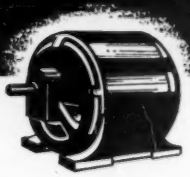
The die cast brush holder shown in Figure 2 is used on a motor for a battery-operated industrial truck. This type of application represents a large percentage of the industrial motors built by Electric Specialty Co.

The alloy used for these die castings is a Red Brass which meets military specifications. Die life for the single cavity dies used for brush holders is reported to be excellent.

The type of heavy duty motor produced by this company must be built to specification and no single model is likely to be produced in quantities remotely approaching those characteristic of small fractional horsepower motors. It is therefore difficult to standardize components in order to simplify production or cut costs. The use of die castings for brush holders is an outstanding exception where identical or closely similar units can be installed on most models.

Here's Another **ACCURATE DIE CASTING...**

END BELLS FOR A FRACTIONAL HORSE POWER MOTOR



THE matter of cost was of paramount importance on this particular high production job. We were able to produce castings which answered every requirement of close tolerance, strength and uniformity at a price considerably under that of stamped or sand cast end bells.

NOW is the time to give careful consideration to the economies made possible through the use of die casting. We may be able to point out some pleasant surprises in this direction.

ACCURATE *DIE CASTING Company*

3089 EAST 80TH ST. CLEVELAND 4, OHIO

ASME ELECTS PRESIDENT

The election of J. Calvin Brown as president during 1951 of the American Society of Mechanical Engineers was announced at the society's annual meeting at the Hotel Statler, New York City, recently.

The new president will succeed James D. Cunningham, of Chicago. A mechanical engineer and attorney-at-law specializing in patent, trademark and copyright litigation, Mr. Brown has been a member of ASME since 1928. He holds degrees from Hamilton College and the California Institute of Technology.

INDUSTRY NEWS

FORT DIE CASTING CHANGES PLANTS

The Fort Die Casting Corp. of Detroit has announced the removal of its production facilities and offices to a new building in Marysville, Mich. The change was made in order to have a larger working space, according to Robert Agajeenian, general manager.

The company's new plant in Marysville has 100,000 square feet of operating floor space, and has been remodeled to suit its requirements. Inside cranes and better rail and truck facilities will aid the company in achieving improved materials handling.

The company, manufacturers of zinc, aluminum and lead die castings, has requested that all mail sent on or after December 26, 1950, be addressed to the new offices in Marysville.

TWO PROMOTED AT ALCOA

Lewis P. Favorite has been named product manager in charge of the sale of die castings for the Aluminum Company of America. Formerly manager of Alcoa's St. Louis district sales office, he has been succeeded in that post by W. O. Gairns, who was assistant manager of the company's Atlanta sales office.

Mr. Favorite joined the Detroit sales office of the company in 1927, after attending the University of Michigan. Mr. Gairns, a graduate of Lehigh University, joined Alcoa at the Chicago sales office in 1928.

ADVANCE TOOL & DIE ANNOUNCES APPOINTMENT OF CHIEF ENGINEER

Charles Zach has been appointed chief engineer of the Advance Tool & Die Casting Co., Milwaukee, according to C. E. Rowe, works manager.

Mr. Zach has been connected in the past with the Mall Tool Co. and with the Chicago plant of the Precision Castings Co.

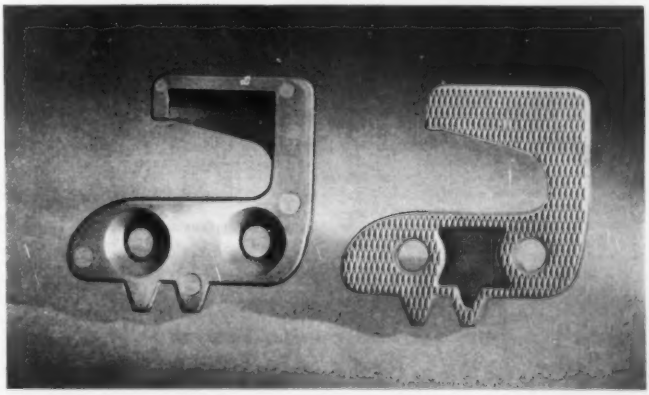
SCHULTZ OPERATING IN CANADA

The Schultz Die Casting Co. of Canada, Ltd., Wallaceburg, Ont., is manufacturing die castings for both the Canadian and American markets. Controlling interest in the company was recently purchased by A. St. Clair Gordon. Some of the officers and directors of the Canadian firm are also connected with the Schultz Die Casting Co. in Toledo.

ECLIPSE BOARD ELECTS A. C. PERKS

The board of directors of the Eclipse Fuel Engineering Co., Rockford, Ill., has elected A. C. Perks to the office of president and general manager. Mr. Perks was formerly executive vice-president in charge of production. H. P. Howell, formerly president, was chosen chairman of the board.

Other officials of the company, manufacturers of a line of gas-fired industrial equipment, are J. H. Sands, executive vice-president, and K. A. Scharbau, treasurer and controller.



These zinc die castings are used by the Ford Motor Co. in the 1950 Ford. A rod is fitted across the top of the casting, with a spring and a nylon block sliding on it. The parts, for the right and left doors, respectively, are used to hold and lock the doors on the Ford. This part is fastened to the door post frame, and a wedge on the door slides into the slot and contacts the nylon block, holding the door against vertical motion. The rotary gear lock on the door meshes with the rack teeth on the bottom of the casting, holding the door closed. Ford men say this is the best and most positive latching system that they have ever used.

ALUMINUM LEAD AND ZINC

DIE CASTING BY FORT

ASSURES ACCURACY, QUALITY AND FAST DELIVERY

FORT has a complete engineering and designing department at your disposal with complete tool and die building facilities on the premises.

FORT has a large die casting department with new FORT-built die casting machines being added regularly.

FORT has designed and built a new machine for casting automobile grilles and other items of comparable size—actual die space is 40" x 60" x 36" thick.

FORT has the enlarged facilities of its Detroit plant combined with the new Marysville, Michigan plant to greatly increase the production of FORT quality die castings to meet the most exacting delivery requirements.

"Certified Analysis Alloys"

FORT DIE CASTING CORPORATION

897 LAWNDALE AVENUE • DETROIT 9, MICHIGAN

BORG PROBLEMS:

To develop parts that would be strong, lightweight, and capable of being produced rapidly and economically in large quantities to close tolerances.

GRC* SOLUTIONS

Dial Hub and Adjusting Screw, engineered by GRC . . . *still* more GRC precision zinc die castings to help manufacturers solve their small parts problems.

BORG PRODUCT:

New, improved Bathroom Scale (800 series)

* TINY, PRECISION ZINC DIE CASTINGS

BORG-ERICKSON is just *one* of the hundreds of manufacturers who are successfully producing new designs and new products and enjoying new economies with GRC's revolutionary high-speed, mass production methods. Simple or intricate—GRC zinc die castings as small as .000004 of a lb. are turned out *automatically* . . . completely trimmed ready for use . . . from 100,000 pieces to many millions . . . *smallness unlimited* . . . at amazingly low cost *to you.*

Bulletin and samples available on request.

MAX. WT. -½ OZ.
MAX. LGTH. -1¾"
SMALLNESS UNLIMITED

GRIES REPRODUCER CORP.

800 East 133rd St., NEW YORK 54

ACHESON COLLOIDS EXECUTIVE RETIRING

George R. Siegrist, executive vice-president, treasurer and director of the Acheson Colloids Corp., Port Huron, Mich., is retiring because of ill health after 30 years of service.

Mr. Siegrist joined the company in 1911 and later was transferred to Acheson's European plants in Verviers, Belgium; Novara, Italy; and Epinol, France. Rejoining the Acheson Port Huron firm in 1920, he was elected treasurer in 1928 and appointed executive vice-president and director in 1932.

ADDRESSES ENGINEERING GROUP

Herman L. Smith, executive technical engineer of Federated Metals Div., American Smelting and Refining Co., New York City, gave an address recently before a meeting of the Baltimore section of the American Society of Lubrication Engineers. His subject was "Bearing Metals — Their Properties and Uses."

Mr. Smith called attention to the fact that since the end of World War II the number of bearing alloys used in industry had dropped from above 200 to five basic types. A discussion of the properties and uses of the five tin-base and lead-base alloys was followed by a review of casting methods.

ALCOA INCREASES CAPACITY

Two programs that will boost defense production of aluminum more than 25 per cent annually were announced recently by I. W. Wilson, senior vice-president of the Aluminum Company of America.

The first, a "quick action" utilizing standby facilities not economical to operate in peacetime, will add 158,000,000 pounds of the light metal a year to present production.

The second program is an expansion plan that involves the erection of permanent capacity by Alcoa. This plan will be achieved by expanding present

OPPORTUNITIES

AIR FLASKS AVAILABLE

5000 lb. test; 17" diameter, 63" long; 6 cu. ft. internal capacity. For further information write:

THE BURDETT OXYGEN CO.
3300 Lakeside Avenue
Cleveland 14, Ohio
Attn: J. F. Wagner

facilities at the Point Comfort, Texas, plant, and by construction of a new plant utilizing electric power generated by gas or coal. It is expected that this phase will add some 240,000,000 pounds of aluminum a year to present production.

SUNDBERG STRESSES VALUE OF PRODUCT DESIGN

Industry is finding that product design is as important as research in obtaining new customers and keeping old business, Carl W. Sundberg, partner in the firm of Sundberg-Ferar, industrial designers, said in an address in New York recently. Good design for the products of industry not only promotes sales, but also supplements the development of new and better materials, Sundberg pointed out.

REJECTS IN INDUSTRY TOTAL $3,000,000,000 ANNUALLY

American industry is making three billion dollars of faulty products a year, the American Society of Mechanical Engineers heard recently at their annual meeting in the Hotel Statler in New York City.

The figure given above is the total cost of rejected products made in this country, and it is greater than the retail value of all of the household electrical appliances, including radio and television sets, produced here in one year.

Mr. Howard Coonley, who gave this figure in an address before the ASME meeting, called for greater standardization in industry and urged direct and active interest in quality control. The widespread adoption of standards would cut down the number of rejects and make possible better quality products at lower cost, according to Mr. Coonley, who is chairman of the executive committee of the American Standard Association.

FROM CLERK TO PRESIDENT

Leonard L. Robb, who joined Stewart-Warner Corporation in 1928 as a stock record clerk, has been appointed assistant to James S. Knowlson, president and board chairman of the company. Since 1942 Robb has been production control manager of the lubrication equipment and automotive accessory division of Stewart-Warner. He was graduated from Harvard in 1925.

UNIVERSAL
Die Castings

Preferred WHEN ONLY THE BEST IS GOOD ENOUGH

There must be a reason why so many highly discriminating manufacturers entrust *all* of their work to us. The reason is they *know* from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.

If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.

UNIVERSAL
DIE CASTING COMPANY

5001-05 SANTA FE AVE. • LOS ANGELES 11, CALIF. • TELEPHONE: KIMBALL 7264

ZAMAK
ZINC BASE
DIE CAST ALLOYS
You're sure of Quality and Service
Specify "Certified" for High Quality . . .
Laboratory Controlled Zinc Alloy.
Certified Alloys Co.
BEDFORD, OHIO

DISCRIMINATING BUYERS HAVE SELECTED
STROH
SINCE 1903
FOR SERVICE
STROH
SINCE 1903
FOR QUALITY
STROH
SINCE 1903
FOR ECONOMY
STROH DIE MOULDED CASTING CO.
520 E. MICHIGAN ST. MILWAUKEE 2, WIS.

CORED HOLES

(Continued from Page 23)

tened together, the top is held in place without any additional fasteners.

The front part of the housing is hinged. Here again, the use of bosses and cored holes has been means of simplifying assembly. Two bosses at sides of the front casting fit into cored holes in the right and left side panels so that when the case is assembled, the hinge is complete without the use of any separate pins, stampings or other additional components.

The use of cored holes and bosses throughout the mechanism has meant actual savings in assembly costs. It is characteristic of the die casting process that holes and bosses can be formed within such close limits as to size and location that few secondary operations are needed.

In the six die castings which make up the housing, some of

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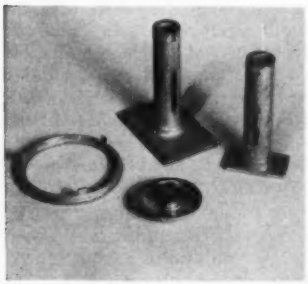
the mating holes and bosses are produced by stationary cores which move with the die halves; others require moveable cores because they lie in a plane which is perpendicular to the die motion.

Physical properties required of the housing castings include the ability to withstand impact without breaking, to be rigid and dependable and to age satisfactorily.



5. CROSS SLOT IS CORED intersecting the longitudinal center hole of these stamp plungers, die cast in two different sizes by means of inserts in the die.

A spectacular, though not unusual, application of die castings is to be seen in the number wheels which imprint the year, month, day, hour and minute. These are produced by using slides to form each segment of the circumference.

The raised letters and numerals are sharp and clear, and the durability of the printing surface is excellent so that the indicia remain legible throughout the life of the mechanism. On the minute wheel, there are four figures per slide, whereas the hour wheel has only two figures per slide.

Not only is it possible to form the raised numerals around the circumference, but on some of the wheels, there are face gears and ratchet teeth as an integral part of the casting. A group of these various number wheels is shown in Figure 3. Notice, for example, the small date wheel which has 31 numerals around its perimeter, as well as a shoulder pinion on one side and ratchet on the other.

The motor barrel, Figure 3, is also die cast. This piece drives

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the minute wheel and has a gear formed integral with its OD. The die parting falls along the face of the gear, so that a simple facing operation removes all flash.

There are a couple of other interesting uses of die cast parts in the construction of this mechanism. One of these is the plunger and plunger arm assembly. This entire unit is die cast in zinc, Figure 4.

The plunger consists of a tubular shaft with a flat plate at its lower end to which is mounted the stamp pad. The tubular shaft is cast with an OD which fits through a cored hole in the supporting arm, although neither the shaft nor the hole needs to be machined.

A guide pin driven through the supporting piece, is retained by a longitudinal slot cored through the plunger shaft. Another cross hole cored through the plunger shaft mates with a through hole in the plunger cap,

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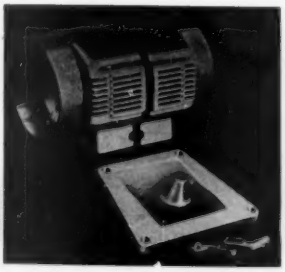

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and is used for a pin to hold the cap in place. Thus, the complete plunger assembly is ready to fabricate as received from the die caster without any machining—thanks to the size, shape and location of cored holes.

The plunger is made in two sizes, each with a different width of stamp pad. Inserts in the die make it possible to use the same die block with an adapter so that both widths of plunger head can be cast on the same size of shaft.

Peened to Hold Glass

Also interesting because of its solution for an assembly problem is the bezel for the front window. This circular casting, Figure 5, fits snugly into the aperture in the front wall of the housing. An undercut groove for a snap ring is milled inside to hold a glass plate and reflector. Three prongs formed on the inner rim of the casting are peened over to hold the bezel permanently inside of the window opening.

A stamping might have served the purpose for this bezel, but the means of assembling it would be far more difficult, the fit of the bezel into the window opening would require more hand fitting, and the amount of metal waste would be more than 50 percent.

All in all, Follett Time Recording Company has made good and effective use of the inherent features of the die casting process to obtain a housing which goes together easily, which is strong enough to stand the gaff of hard commercial usage, and is less expensive than any competitive method of fabricating.

CLEAN SURFACES

(Continued from Page 43)

tank. Floating oil and other soils are then easily skimmed from the surface of the solution and as they fall over the dam into the trough formed by the angle iron they may be discharged.

The tank drain is also an important part of the cleaner installation. An all-steel drain of adequate size is gen-

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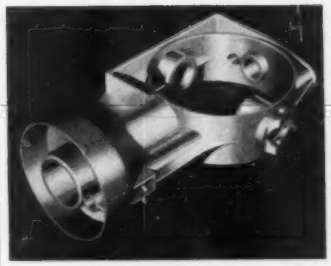

The design of a die casting starts with a consideration of the required holes and openings. These, in turn, must be surrounded with a minimum of metal consistent with the requirements of appearance, strength and the needs of the die caster for proper draft and tolerance.

Lowest cost can be obtained by designing so as to simplify die construction and promote practical casting and finishing operations. The die cast aluminum Wringer Head at left is a good example.

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erally recommended. The opening of the drain on the inside of the tank may be loosely fitted with a pipe nipple about 2" long. Having this nipple in place prevents the discharge of sludge into the sewer line in the event of emptying the tank for the purpose of cleaning it or for any other reason. When the tank has been emptied the operator can then shovel out all sludge after which the loose fitting nipple is removed, the tank flushed out with a hose, and then the nipple replaced before the tank is charged.

It is generally thought to be better practice to use steel electrodes instead of the tank walls for conducting the current through the solution. Also, bus bars, cables, and work rods in the electrocleaning installation should be large enough to carry the necessary amperage without heating or causing too great a voltage drop.

When Is A Metal Surface Clean?

There have been recent developments[5] in quantitative techniques for determination of the degree of cleanliness of a metal surface, which are of interest to the finishing industry. In the past, experience concerning the ef-

fect on subsequent processing operations has been probably the one criterion most relied upon.

Because of its ease of application and apparent sensitiveness to soil retention, water break is a time-honored method for evaluating the degree of soil removal. Presence of water break in a film of water over a metal surface is generally indicative of the presence of some water repellent material, generally of an oily or greasy nature.

It has recently been pointed out[6] that in practice it is possible to have a metal film evenly coated with a contaminating material which does not give water break, but which can cause processing defects. Some surface active agents can coat metals in this way, providing a film which does not repel water, and is of extreme minute thickness.

Another method that has been suggested for estimation of the degree of cleanliness is either to weigh the metal piece being cleaned before and after the cleaning process, or to wash the cleaned piece with solvent, and weigh the extract.

This method suffers from the gross nature of the pieces being cleaned, or if smaller test panels are used, the amount of soil remaining is less than the sensitivity of the balance in use. Zakarias[7] has suggested that a method for estimation of cleanliness is to rub the cleaned surface with white tissue paper and then observe for grease and other soil. This test is, essentially, of a qualitative nature.

Still another method for testing the efficiency of a metal cleaner that has been suggested[8] involves the use of a fluorescent dye in the oil on which cleaner removal tests are being made. If not completely removed the contaminant can be detected in ultraviolet light either visually or recorded by photographic means.

The most recent advance[9] in the detection of soil retained by metal surfaces in cleaner tests is based on the radioactive tracer technique. This test is operated by combining with an oily soil a C_{14} tagged organic compound dispersible in the oil on which cleaning tests are being conducted. It permits a quantitative estimate of soil removal or retention. The sensitivity of the method has been measured as 2×10^{-7} g./cm.

The results of tests recently reported[6] have shown the water break method to be more sensitive than the fluorescent dye method for determining the degree of surface cleanliness.

[1] Based on technical information supplied by the Oakite Products, Inc.

[2] Based on data given by Ray Bray, Supt., Crown City Plating Company, Pasadena, California, on cleaning brass for plating in "Oakite Service News" — (Mar.-Apr., 1950), published by Oakite Products, Inc., New York.

[3] A discussion of the principles of preparing metal surfaces for plating presented at Wayne University, Detroit, (1948) by Dr. Walter R. Meyer, Enthone, Inc., New Haven, Conn.

[4] Overcash, Proc. Am. Electroplaters' Soc. (1949).

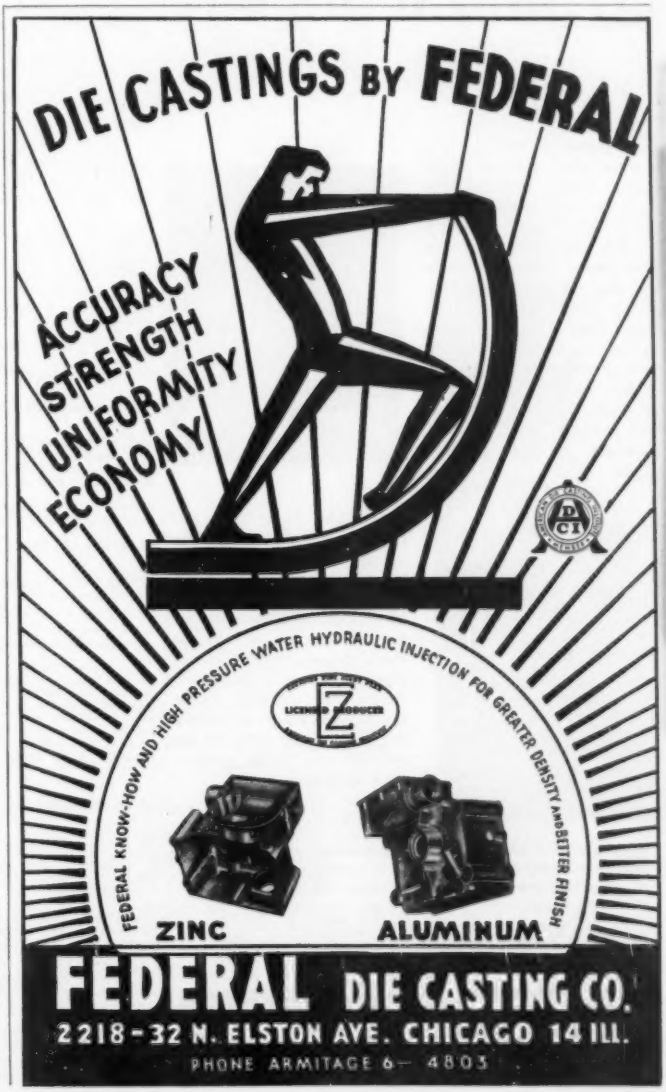
[5] The recent 98th meeting of the Electrochemical Society featured a symposium on the evaluation of a clean surface.

[6] "Detection of Soil Removal in Metal Cleaning by the Radioactive Tracer Technique"—A paper by J. C. Harris, R. E. Kamp, and W. H. Yanko presented at 98th meeting of the Electrochemical Society.

[7] Zakarias, Chimie et Industrie, Vol. 36, pp. 1095-1100 (1936).

[8] "The Detection & Estimation of Oils on Metal Surfaces with Ultraviolet Light Procedures"—A paper by O. M. Morgan and L. F. Hoyt, presented before the 98th meeting of the Electrochemical Society.

[9] J. C. Harris, R. E. Kamp, and W. H. Yanko, ASTM Bulletin, No. 158, pp. 49-52 (1949).



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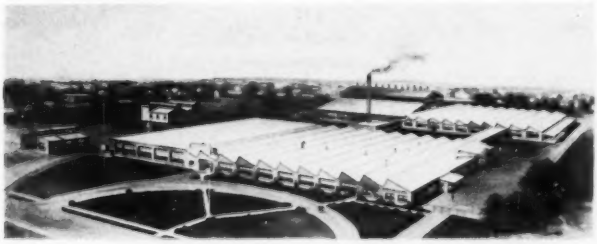

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